COAL AGE

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Accidents Will Happen!

IF a mine official really wants to prevent injury to his employees, he must constantly teach his men by precept and example. Ignorance will not effect its own elimination; it must be crowded out by knowledge. Almost any man is teachable; the difficulty usually lies in the lack of ability to instruct him, which in turn may be overcome by patience.

AFTER *an accident has occurred, how weak and insufficient it sounds to hear someone say, "Well, accidents will happen!" Ninety per cent. of all mine accidents result from carelessness or ignorance. Therefore there is a cause, and it ought to be removed.*

The careless workman is more blameworthy than the one who is ignorant. Carelessness recognizes danger, but, recognizing it, takes a chance. The worst kind of carelessness is that occurring in connection with work assigned for the purpose of protecting others. Carelessness in mine inspection, for example, involves grave criminal responsibility.

To remove the causes of accidents discipline of a high order is essential. The compilation of a large set of rules is not sufficient. Lax enforcement of regulations is a common cause of failure. Rigid observance of a clear and definite code of requirements is always productive of good results. Without this, discipline is out of the question.

That mine official who attempts to seek refuge behind the worn-out adage, "Accidents will happen," is but half a man. The worth-while manager immediately seeks the exact cause of every accident. He is not satisfied until he receives a complete report from a committee or special board of inquiry.

It is not sufficient merely to hold a formal investigation, no matter how thoroughly the investigation is carried out. If similar accidents are to be avoided, the cause of the first one must be carefully explained before a gathering of all the members of that branch of the organization having authority or power to prevent such accidents. Nothing is ever gained by a suppression of facts brought out by an investigation.

A few accidents are unavoidable, but they represent only a small part of the whole number. Such casualties cannot be foreseen. However, men in authority can prevent the improper classification of accidents and should not allow preventable ones to be designated as unavoidable, thus losing the benefit of the lesson.

The next time you are about to say, "Accidents will happen," stop and think first; then you won't say it. Only weaklings and incompetents evade responsibilities in this age of industrial safety and efficiency. We must have a new slogan—one that brings out the best that is in us. Let us now say, *Accidents Must Not Happen!*

Opening Shaft Mines

By M. L. Hyde*

SYNOPSIS—The account entitled "Mine Opening" includes many items, and the investment involved is heavier than that for any other improvement. Furthermore, mistakes made here are of a permanent nature and in most instances cannot be rectified. Plans of two types of bottoms are here presented and many suggestions made.

Into the account entitled "Mine Opening" are written all costs incurred in sinking the shaft and the development at the shaft bottom. These include the yards and main and face entry work sufficient to allow the placing of the mine on an operating basis, opening up of a lamp room, office, supply room, test room, shops, etc.; the grading, timbering and concreting of all such work; the foundations for and cost of installation of all machinery and equipment, including cages, landing dogs, gates, car feeders, scales, switchboards, telephones, signals, signs; mine cars, locomotives, machines, pumps, shop tools, etc.; all piping and wiring and its installation; all ballasting of tracks, laying and bonding of rails, stringing of trolley wire and securing it in place; the surface cost for power-plant operation, the surface labor, the disposal of waste and coal, the overhead charges from the office, insurance, taxes, interest, etc. This account is credited with the receipts from all coal marketed and all sinking equipment salvaged.

The Investment Is Heavy

The investment involved is heavier than that encountered with any other improvement. Mistakes can be neither rectified nor lived down. Time and first cost being the essence of the opening of a new property, important features are often sacrificed underground instead of on the surface, where future remodeling is practicable. It is, therefore, obvious that the preliminary engineering and estimating relative to a mine opening deserve serious study.

In planning a shaft mine opening the following points come up for consideration: Avoidance of all unnecessary narrowwork at the bottom increasing the risk of loss from squeeze, compliance with all possible present and future legislation, minimum first and maintenance cost, the connecting up of the two shafts in the shortest time in order that a regular circulation of air may be obtained and the restrictions of the law limiting the number of men allowed in the mine before this is done complied with. The arrangement of the work should be such that during development cars may be placed with the utmost facility, that mining machines may be employed and steel timbering placed as the entries advance; that when operations begin, cars, supplies, waste, men, water, air, damaged equipment, etc., may be handled with safety, economy and speed; that protection is secured against coal-dust explosions, mine fires, flooding, freezing, etc.

Concrete-lined circular shafts provided with steel buntons and wooden guides are preferable to other forms. Such shafts withstand hydrostatic pressure better, offer less resistance to the air, are cheaper and quicker to sink, are more easily maintained and less subject to damage from caving, cage wrecks, steam, etc. In several states the laws now specify that escapement shafts shall be fitted with stairways, and for a long climb in a restricted cross-sectional area the circular stair is ideal.

The management and engineering forces in charge of a plant under construction have neither the organization nor the equipment to do shaft sinking as quickly, cheaply and satisfactorily as the professional shaft sinker. In most cases it is advisable to let contracts for both shafts—including sinking, concreting, equipping with gates, landing dogs, buntons, guides, stairs, pumps, water-rings, drains, pipe lines, cables, etc.

The minimum distance between the main, or hoist, shaft and the escapement shaft should be 500 ft. All entries connecting these two openings or otherwise forming the bottom should be timbered with fireproof material. If the escapement shaft is placed close to the main heading and the hoist shaft at least 500 ft. away, ample room is available for storage yards. Bore holes at the site of each will give all data required for grading. Steel timbering and steel sheet lagging combined with steel track ties make for a bottom practically squeeze-proof, fire-proof, permanent and easily maintained.

Elevators for Future Mines

Future shaft mines not more than 300 ft. in depth will, in all probability, avoid the hoisting of coal in cars. No serious obstacles lie in the way of using bottom-dump cars, delivering in transit to a hopper leading to an elevator discharging direct to tipple screens.

W. D. Ord, of Landgraff, W. Va., and myself designed a car of this kind for use in the drift mine of the Red Jacket Consolidated Coal and Coke Co., at Mitchell Branch, W. Va. It discharged in transit without undue breakage. It was fitted with a drop bottom, pivotally supported at one end and locked at the other. The dump hopper was provided with means for automatically unlocking and dropping the bottom and subsequently returning it to a closed position. The mine where this car is used has a capacity of 5,000 tons per day, and these cars have been employed in it with entire success since 1910. Trolley express locomotives handle up to 30 car trips without uncoupling, stopping or loss of time. No grading is required, and practically all labor is dispensed with.

Elevators capable of handling a shaft mine's requirements would have to be constructed of heavy steel pans suspended between steel hoist rope. These should be in duplicate for safety. Devices for stopping either strand or preventing either from falling in case of a break could be arranged without difficulty.

I am strongly of the opinion that the shaft bottom of the future will be of this type. Neither car feeders, caging machinery nor scales will be necessary. The combination mining and loading machine will do away with the weighed car basis. Locomotives will pull their trips through the dump and half circle back to the parting. The bottom will be part of the main haulage road ungraded, free of machinery and low in first cost.

*Evansburgh, Alberta.

At the present time, however, two types of bottoms are in use—the gravity and anti-gravity, the former being most in vogue. Both of these bottoms are shown in Fig. 1. The anti-gravity bottom is shown in full lines and the gravity by dotted lines where it differs at the kickback entrance to the empty yard. Fig. 2 shows the profiles of each with reference to the floor of a level coal measure.

The operation of a gravity bottom will be first described. An express locomotive coming down the main haulageway with a trip of loads approaches the entrance to the bottom at a fairly high speed. Just before reaching the switch K it uncouples and passes ahead to the empty yard. The switch immediately after the locomotive passes is thrown and the trip deflected to the loaded yard, where it is brought under control by spragging or braking. In order that the cars may continue to travel forward without loss of velocity after being cut loose from the locomotive, the road should be graded back as far as L, or one-half the trip length from K.

The trip is stopped at such a point that the attachment on the first car will engage the hook on the feeder, or that the first car may be coupled to the rear of any cars uncaged. The cars are then sent forward by the feeders E, of which there may be either one or two, depending on the capacity. These feeders consist of endless chains with pivoted hooks, the whole passing around the head and tail sprockets. They are driven direct from a motor through friction-clutch gears. At each side of the chains are rollers running on runways.

Hooks are pivoted to the shafts connecting the side links of the chain. These engage attachments on the bottoms of the mine cars. The hooks are so placed that when the one engaging the first car of the trip is clear it is allowed to drop back and swing. The hook following is in such a position back of the second car that it engages it, taking the full force of the trip and allowing the first car to go free. The grade at the discharge end of the feeder is made rather steep in order that the first car shall fall back and be pushed by the second. This relieves the tension on the coupling while the operator withdraws the pin. The car then floats to the scales. The clutch is then thrown out and the trip held stationary until the first car has been weighed.

The scales D are so placed that cars on leaving the hump at the feeder discharge immediately pass over them, free from all obstruction and before gathering appreciable velocity. These scales should be of the automatic recording type and set on a 1 per cent. grade. They should have a capacity double the maximum load which they will ever be called upon to handle and with a platform

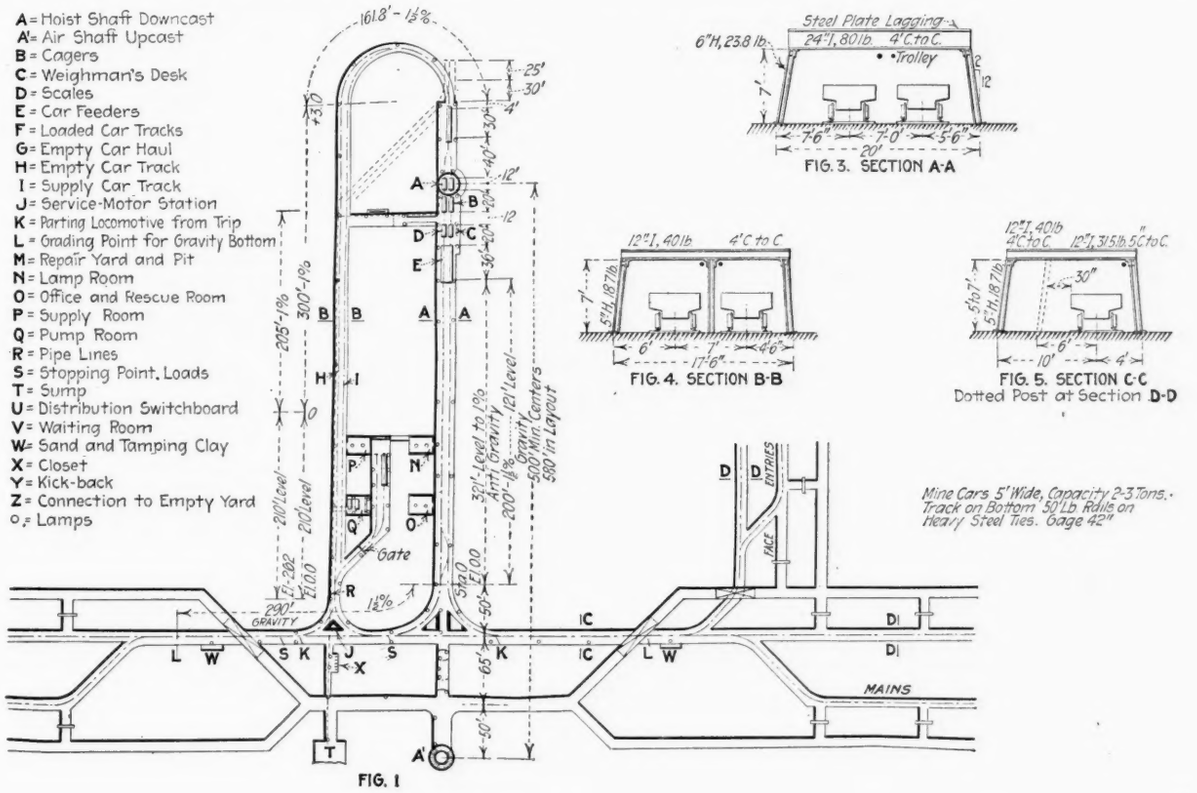

A = Hoist Shaft Downcast
A' = Air Shaft Upcast
B = Cagers
C = Weighman's Desk
D = Scales
E = Car Feeders
F = Loaded Car Tracks
G = Empty Car Haul
H = Empty Car Track
I = Supply Car Track
J = Service-Motor Station
K = Parting Locomotive from Trip
L = Grading Point for Gravity Bottom
M = Repair Yard and Pit
N = Lamp Room
O = Office and Rescue Room
P = Supply Room
Q = Pump Room
R = Pipe Lines
S = Stopping Point, Loads
T = Sump
U = Distribution Switchboard
V = Waiting Room
W = Sand and Tamping Clay
X = Closet
Y = Kick-back
Z = Connection to Empty Yard
o = Lamps
Gate
MAINS
ENTRIES
FACE
Mine Cars 5' Wide, Capacity 2-3 Tons. Track on Bottom 50 Lb. Rails on Heavy Steel Ties. Gage 42"

FIG. 1

FIG. 3. SECTION A-A

FIG. 4. SECTION B-B

FIG. 5. SECTION C-C
Dotted Post at Section D-D

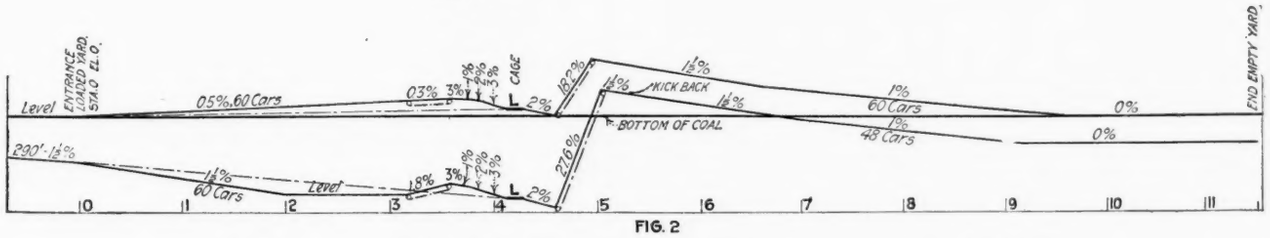


FIG. 2

FIGS. 1 TO 5. PLAN, PROFILE AND VARIOUS SECTIONS OF THE DEVELOPMENT

sufficiently long so that the cars may be on the scales for about three seconds.

From the scales the loads drift down a 2 per cent. grade to automatic safety hooks, or cagers *B*, and then pass to the cages. The cagers should be fitted with a device for absorbing the shock caused by the quick stopping of the load after it has bumped the empty clear. Such an arrangement engages with the attachment on the car bottom, does away with hand caging and insures speed and positive locking of the car on the cage.

Automatic cagers of the double-horn type, 16 ft. long, should be employed and installed on a 3 or 4 per cent. grade. They insure both system and safety in caging.

The empties when bumped off the cages by the loads run on a 2 per cent. grade to the empty trip feeders *G*, which are duplicates of the feeder *E*, or to an automatic car lift of the Holmes type. By means of either device they are elevated to a height sufficient to allow of their running by gravity to the kickback *Y*, and thence to the empty storage track *B*, where they are coupled into trips ready for the express locomotive.

The advantages of the gravity bottom are the speed with which the loads are delivered to the bottom and caged and the rapidity with which locomotives get away with the empties. Feeders are unnecessary where scales are not employed, the cars being then brought direct to the cagers. Power-driven machinery in the loaded yard is thus eliminated.

Its chief disadvantages are: Higher first cost, because all grading is below the level of the coal bed; the longer time required for development, since mining machines are not applicable; the high depreciation of rolling stock when subjected to the jars incident to gravity handling and the risk of serious accident from floating trips becoming derailed or getting beyond control; the trouble encountered in splitting a floating trip and sending half to each track; the difficulty of maintaining a dry cage room when it is the lowest point in the yard; the extra depth of the shaft; the loss of marketable coal during development, because a large portion of the work is below the floor, and the difficulty of keeping the coal clean. The capacity of the empty yard also is less than that of the loaded yard.

The anti-gravity bottom differs from the gravity type only in the method employed for delivering loads and removing empties. Without losing any of the other advantageous features it avoids the objectionable ones.

In operation a locomotive coming down the main gangway with a trip passes by the three-part *Y* curve leading to the bottom to a point where the last car in the trip clears the front switch. The locomotive then backs into the yard and the trip rider on the rear car couples to the remainder of the uncaged cars, or spots the trip on the feeder. The locomotive at the front is then clear and runs direct to the empty yard.

The loads are sent forward either to scales and then to the cagers or direct to the cagers. All grades are against the loaded trip and the cars are pulled forward by the feeders with all couplings in tension. The empties pass by way of the car feeder *G* to the empty yard. In backing the trip into the loaded yards the direction of every car is reversed. The half-circle delivery of empties not only corrects this but avoids the use of a kickback.

Where the trips are delivered oftener than every 12 min., a yard service locomotive is stationed on the main gangway at *J*. In this case an inbound express locomotive is uncoupled at *K* and goes direct to the empty yard. The service locomotive at once backs the trip onto the bottom and returns to its station. The first locomotive in the meantime passes out with empties.

The advantages of the anti-gravity bottom are: Low first cost and high speed in development; the shaft is shallower and the bottom always in the coal; mining machines may be employed for undercutting, resulting in a better roof and straighter ribs; longer life to the rolling stock; greater safety, with loads at all times under control of the locomotive or feeder; avoidance of flying switch practice—both objectionable and dangerous; larger output where a service locomotive is used, and express locomotives get away with empties almost immediately and are never held up by a bottom not quite ready for the next trip. Moreover, a dry cage room is secured, the main sump being below the level of the hoist shaft sump. Loaded and empty storage tracks are equal in capacity. Since the hoist shaft is 8 ft. less in depth than with the other bottom, the power required for hoisting is correspondingly decreased.

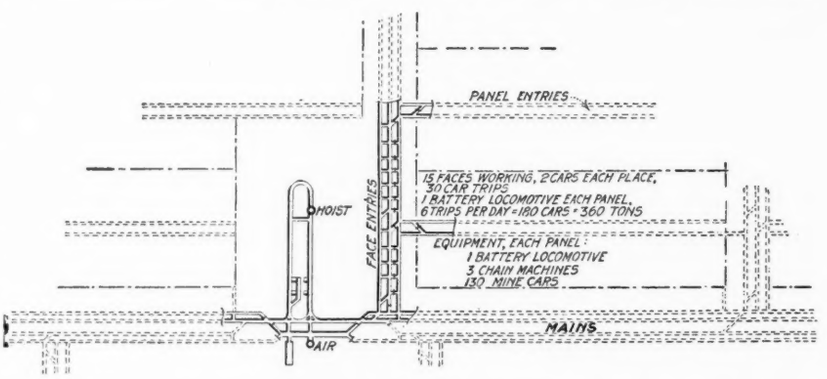


FIG. 6. DEVELOPMENT NECESSARY BEFORE MINE CAN BE PLACED ON OPERATING BASIS

The operating cost of the two types of bottoms will be about equal. The expense of the service locomotive in the one case is offset by the expense of spraggers in the other.

Summarizing, this method of handling cars is safe, moderate in cost, allows of a maximum output, complies with all statutes and gives a clean-cut, strong bottom.

Steel-body mine cars of two to four tons capacity, with wooden bottoms, center dumpers and single-link couplings, will meet the conditions imposed by this bottom better than the center-dumper car with either three links or automatic couplers.

Cars of rock or other waste should be shunted to the waste-car track in the empty yard and left there until coal hoisting is over. Then one of the two loaded tracks should be cleared to allow of waste cars being brought back and caged in straight trips. The tipple routine is badly demoralized if each of these cars has to be caged as it arrives. Rock-bin valves must be cleared of coal and opened, the car dumped and the chute cleared of

waste before the valve is closed. During this time the tipple and shaft crews loaf.

Supplies should be taken into the mine by way of the hoist shaft, after the coal and waste have been disposed of. The waste-car track is then clear and may be used for making up trips of supplies. The escapement shaft is not feasible as a supply-lowering medium. Locomotives and cars are obliged to pass through door-protected crosscuts, to leave their regular paths of travel, air is short-circuited and no saving made in time. By the method described both waste and supplies are handled without interference with either men or coal and at times most suitable to the surface and underground crews.

The proper handling of men, mine water, etc., is of prime importance. The miner on leaving the cage at the shaft bottom should pass down a straight, well-lit lane to the haulageway. He should not interfere with cagers, weighman, shaft labor, machinery, the movement of cars, nor should he come in contact with switchboard stations, pumps, shops, etc. Before reaching the haulageway he should pass both the lamp room and the foreman's office, receiving his lamp at the former and instructions at the latter.

When ready to leave the mine he should turn in his time and lamp and go direct to the clean, cheerful waiting room, where he remains until a cage is available. Injured men may go to the office for first-aid treatment or may be taken at once to the surface. The lane referred to must be wide enough for stretcher bearers. The escapeway from the haulageway to the escapement shaft should be as close to the manway from the haulageway to the hoist shaft as possible. Every man will then be familiar with its location.

Sumps Should Have 48-Hr. Capacity

The mine water should be drained into sumps having at least 48 hr. capacity. The discharge line should be in the escapement shaft, with the main sump placed as close as possible. In this shaft there is less danger of freezing, pipes run less risk of damage and are more easily repaired from the various stair landings. Furthermore, the returns are the proper entries in which to place ditches and pipe lines.

All pipe lines placed in the shaft should be in duplicate and of cast iron, with flanged joints, as threaded connections are difficult to handle. Motor-driven centrifugal pumps should be installed at a station adjoining the shop, where they will be under the eye of a mechanic at all times. In nongaseous wet mines a vertical gasoline engine so placed that it can be belted to one of the pumps will allow the keeping of the bottom dry even though the entire power plant should be crippled. The overflow from the hoist-shaft sump should be at a higher elevation than the main sump, and should be self-draining. The hoist sump should not be over 5 ft. deep. The escapement shaft requires no sump, a concrete ditch from the bottom to the main sump being sufficient.

Steam jets should be placed at the foot of each shaft so that in freezing weather, either or both may be "cooked" during the night.

Damaged cars are often loaded before their condition is discovered. When these come to the bottom they should be caged if possible. If not, they should go direct to the waste track, be unloaded to an empty on the opposite track and then sent to the shop. A direct track from the haulageway to the shop should be provided for machines and locomotives and no opportunity afforded them to block the haulageway.

Power cables, telephone and signal lines should be lead sheathed and taken into the mine through the hoist shaft. Separate breakers and ammeters should be provided for cables at the power house and separate switches and fuses at the mine panels. At every underground electric station sand buckets should be kept for emergency.

One dozen 6-gal. sand buckets and one dozen 2½-gal. chemical fire extinguishers should be kept in racks in front of the foreman's office available for immediate use. When the mine is dusty, water lines should be led from the dumping station along the main returns. All such lines should be provided with hydrants at suitable points.

A closet should be located directly off the haulageway and close to the manway to the shaft bottom. It should be supplied with chemical closets, urinals and a ventilation duct to the return air.

Figs. 3, 4 and 5 give sections of the bottom entries at different points. The loaded yard entry, Fig. 3, is not obstructed with center posts. Derailed loads are likely to knock such posts out, with the possibility of serious results.

Fig. 6 shows in solid lines the approximate amount of main and face entry work necessary to place a mine on an operating basis. The cost of this work is all classed as "Mine Opening."

To some the decided views held by the writer as to the necessity of fireproofing the shafts and bottom, using heavy rails on steel ties, with ash ballast, may seem extreme. They are not. The financing of poorly designed and unsafely operated mines is being discouraged more and more. The associated companies now writing workmen's compensation in the United States are bringing these points home. The low premium rates offered, the freedom from litigation, the saving of time, the uncertainty of future strict legislation, the lower depreciation reserve—all warrant the protection suggested.

Mine-Equipment Costs

The July 1 issue of *Coal Age* is to be devoted to the subject of coal-mine equipment, and we want to particularly feature the costs incurred in putting in new plants and new machines, also data with reference to the charges necessitated by the rehabilitation of old plants. We want all our readers who have had experience in the building of mining plants, or the installation of any kind of mining equipment, to tell us what they know concerning this phase of development work. You don't have to mention the name of the mine if you don't want to, nor is it necessary to have your own name accompany the publication of the article if you see reason why this should not be done. Send in your article at the earliest moment and include some good photographs or drawings of your mine equipment. We want this July 1 number to be interesting and valuable from cover to cover.

The Towering Need in the Education of the Engineer of today is the definite knowledge that a human life is worth more than a machine and that there is a way to direct the great resources of power in nature for the use and convenience of man without bringing more human suffering and misery into the world.—C. B. Connelley, at La Salle Meeting of the National Safety Council.

The Park-Development Problems in the Hard-Coal Region

By Karl B. Lohman*

SYNOPSIS—Shows that a park must be designed to satisfy the needs of those for whom it is created and must be planned with full recognition of its utilitarian purpose. Describes what are the characteristics of formal and informal parks and the functions of each.

It was a little over two score years ago that Americans first realized the significance of park development. Since the completion of Central Park in New York there has been a widespread, though gradual, awakening of the nation to the important part taken by parks in national progress. It has affected parts of the East, the middle West and, especially within recent years, the far West. Now it is beginning to penetrate even the smaller communities of the anthracite region.

Such signs of awakening, particularly in the hard-coal mining communities, are of more than passing importance. However vague in some instances may be the indication, it points the way toward a time of better homes, pleasanter yards and transformed towns—a consummation devoutly to be wished.

To one who has lived in a sordid mining town the urgent need for good breathing and recreation spaces—that is for parks—is clearly outlined. He sees that the peculiar daily occupations of the people accentuate that need; their hazardous work turns them naturally during rest hours to excitement and stimulants. Consequently, these people, of all others, require healthful diversion, plenty of fresh air and out-of-door play. Moreover, the added verdure and orderliness that a park gives to the community will assist in brightening daily the lives of a people who are undoubtedly affected by their depressing outlook, which embraces a somber breaker with its flanking piles of culm—the whole mile-long chaos—of a mining plant.

Still a Certain Indifference to Parks

Fortunately, attempts at park development have already been begun. The start in itself is commendable and praiseworthy. We see it in fact quite splendidly inaugurated in some of the larger hard-coal cities. But in both the large and small communities there is a tendency toward an unhealthy self-complacency in what has been done or in what is yet to be done along park lines. What is being done may tend rather to diminish than to increase the enthusiasm for park development. For in this as in other fields of art, good things will increase the passion for the beautiful, while bad things will discourage it.

Even tendencies toward error, therefore, must be met at once boldly and constructively, for park development is a serious thing. It is serious because parks are as permanent as roads and because they will affect the lives of so many people, now and yet to come.

*Landscape architect, 1024 Miners' Bank Building, Wilkes-Barre, Penn.

Consequently, communities must be reminded that the movement toward good parks does not imply, for example, an impulsive acquirement of any piece of ground suited or unsuited, nor the introduction of a path or road at any juncture through mere caprice. Nor does it justify the importation of strange plants, ungrowable and unsightly, distributed over an area in a hit-or-miss fashion. Communities must be taught that the geranium and coleus are not appropriate under all circumstances, and may not be placed in the middle of an inherently beautiful grass plot, for instance, as if the planter in his unwisdom were not satisfied to let well enough alone.

That is not the meaning of park design nor is it the way in which the greatest possible charm and the most artistic results can be obtained. And yet such mistakes and a multitude of other errors are tending to lead the way in park development among mining communities. With the hope, therefore, of obviating in a measure at least the continuance of a rather blind movement along park-improvement lines, let us consider, first the requisites of a good park, and, second, appropriate park treatments.

Requisites That a Good Park Should Possess

The term "park" itself for a long time has been variously interpreted. Until recent years the popular conception has been so ill-defined that at any time a park was just as likely to include unessentials as it was to exclude what we consider today the primary requisites. It hardly seems possible of belief that in the city of Washington, Penn., a so-called park can still exist where recreation, as we commonly understand it, has been and is today actually forbidden.

However, at present the general understanding of a park is a somewhat definite one. The park itself may vary, of course, from a small playground, neighborhood park or square to a playfield, river bank, country park or huge reservation. But the public perceives its function and prime requisite as being a place wherein to breathe, to enjoy oneself, to play. In general, therefore, we require of a park that it measure up to that conception.

Recreation—the prime necessity of a park—is of two kinds. It includes both exertive and receptive recreation, though it may be possible to combine both. By exertive recreation is meant walking, running, tennis, baseball, dancing, skating and all the diversions in which one may exert himself for purposes of pleasure.

By receptive recreation, on the other hand, is meant music, good air, shade and sunlight, pleasant outlooks, simplicity of treatment, harmony, unity and beauty. Obviously, such pleasures would come to one in a state of passive receptivity. Provisions for this kind of recreation would include opportunities whereby people might enjoy one another's society. To this end promenades or opportunities for family outings should be provided.

Thus the park is not to be considered as an end in itself, but as a means of providing certain desirable forms of recreation. In small parks all forms of recreation

cannot receive recognition, yet any park, no matter how unimportant, must have as its paramount reason for being some provision at least for passive or active play, or for both of these. The most important requisite of a park, therefore, appears primarily to be its availability for recreation, and its ultimate usefulness cannot be wholly attained unless this end be continually kept clearly in view.

Every park, wherever, it be, is successful only in so far as it is thoroughly useful. We naturally ask ourselves how and in what ways this end may be attained. First of all, the park must be accessible. Obviously the choice of a site must be governed by the open spaces that are available and suited to the purpose. Also the desirability of any choice must rest partly on the need that is felt within a given community or portion of a community for such improved open spaces. This need may indicate anything from a mere playground or a neighborhood park, in the midst of a group of homes, stores or public buildings, to an outlying development or country park with great breadth of outlook and large opportunity for variety of effect.

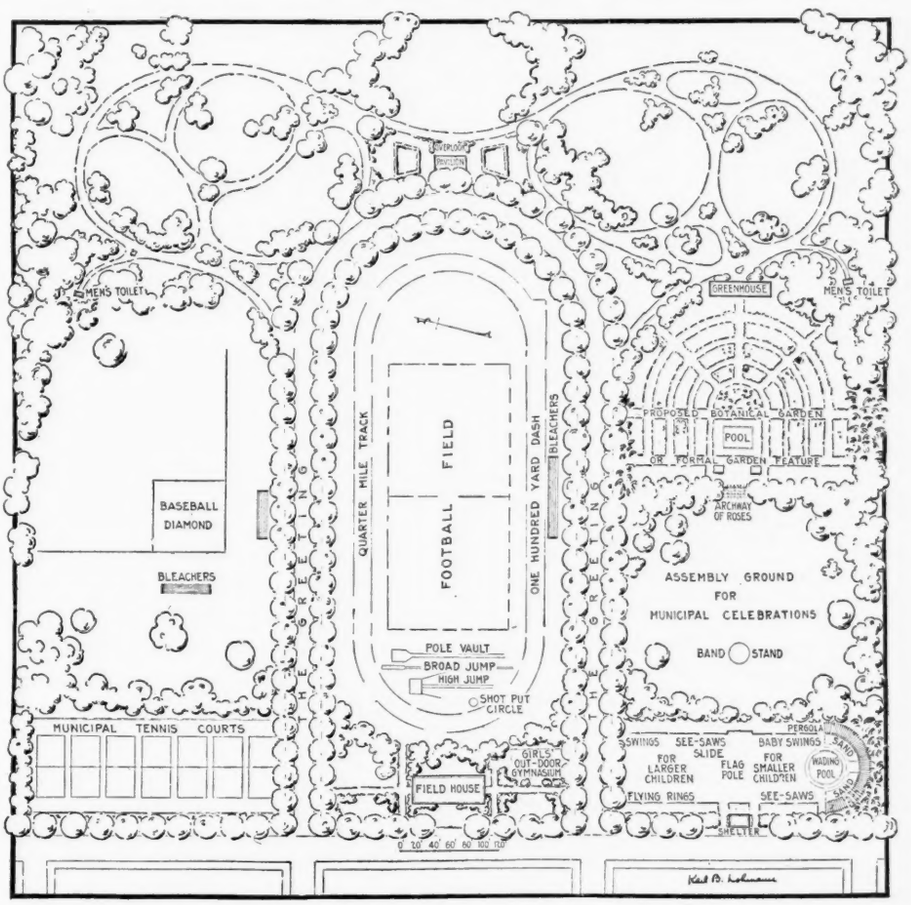
Reasonable accessibility is important, and yet people in large cities have felt so strongly the need and advantage of parks that they have been known to walk or even ride great distances to enjoy them.

A second way to make a park useful is to have it appropriately designed from the beginning. That implies, in other words, that the possibilities and limitations of a given location have been thoroughly considered from every conceivable angle. That in essence is the very meaning of park design. We cannot, with reason, expect a park to "happen." Landscape artists, it is true usually aim to make their work so naturally and perfectly adaptable to the ends intended that they compliment themselves when their work appears as if it had just happened. But such a result is most generally obtained when the problem has been most carefully and artfully studied. Moreover, any given area will only exhibit real beauty when the functional necessities have been completely supplied.

There are two broad types of treatment in which we may best secure beauty with coincident usefulness. These types are the formal or artificial and the informal or natural.

How the word formality associates itself in social life with form in dress, in manner and in speech! The term as applied to parks is closely connected with its other uses. Formal parks grow out of the demand for regularity, ceremoniousness and artificiality. They are fundamentally inspired by the works of man and his ways of living, his means of travel and his architecture.

Hence definite boundaries and the dominant architectural needs inspire any formal development of an inclosed area. This is apt to be the case where the plot under consideration is rather small, as, for instance, a city or town square or neighborhood open space, or where the streets and perhaps the buildings also, dictate a "straitjacket" treatment. An area also which is to be developed as a park and one which must serve as a forecourt to some county or other public or quasi-public building should be treated with some formality in design.



PLAN OF A PARK SUPPLYING BOTH ACTIVE AND RECEPTIVE RECREATION

If, then, this formal treatment is demanded by the piece of ground under consideration, the development proposed must relate itself to the surrounding conditions, to the traffic boundaries and prevailing lines. The design must repeat, in spirit if not in fact, the direction of traffic, the alignment of boundaries and the lay of some dominating structure. In so doing, also, the proper emphasis must be given to lines of symmetry and center points, by the appropriate placement of park furniture—fountains, statues, flagpoles and seats—and by the placement of plants, whether trees, shrubs or flowers.

Plants in the formal park may serve two important functions. They may be part of "boundary planting" on the one hand or of so-called "carpet-gardening" on the other. In any event, plants must be placed in general so that they will be symmetrical not only with respect to the design, but in their relation to each other.

By boundary planting is meant the placement of plants so as to mark the larger boundaries or framework of the area and the boundaries of the smaller divisions of the park.

Such planting may consist either of trees, shrubs, or flowers or of all these in combination. When trees are so used, they are located at equal distances, far enough apart to satisfy the physical needs of the given plants as well as the æsthetic needs of the selected design. Such trees need not necessarily be chosen because of extreme formality in aspect. They need not resemble the toy trees of a Christmas Noah's Ark. Even the hardiest trees may be assigned to this task with ample success, however informal their appearance may be. The reason for this lies in the fact that repeated informalities achieve formality, a good illustration of which may be found in the all-over design of the average wall paper.

Consequently, it is indiscreet to choose plants of inferior aspect just because they conform themselves to formal lines, such as, for example, the *Catalpa bungeii*, which has such large vogue in the coal regions. Nor is it well to choose trees which are subject to so-called topiary work or trimming to curious shapes. The foregoing observations on choice of informal trees are equally applicable to shrubbery masses, which may also be used for boundary purposes.

Border Planting of Flowers

Oftentimes it is highly desirable to grace the boundary of planting, whether of shrubs alone or of shrubs and trees, with flowers, especially with the perennial varieties. This is known as "border planting of flowers," and it may become a feature of unspeakable charm, revealing ever new floral displays with the changing seasons.

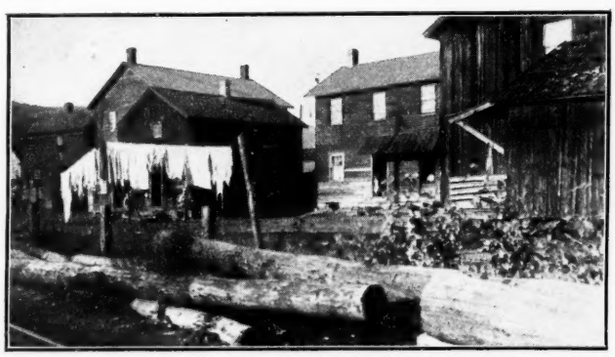
"Carpet-gardening," obviously so named because when seen from above it presents the appearance of a carpet, is a type of gardening that is filled with possibilities; but it is strictly limited in its use to the formal park, or to the formal portions of a park. Its success depends primarily, therefore, upon appropriateness. It must bear direct relation to the park of which it is a portion, and must possess for the most part the virtue of simplicity. Its further success will depend upon the unity of effect—that is, upon the proper arrangement of the plants according to their color, form and texture. It must convey sharp contrasts, yet a simultaneous feeling of harmony, a nicety of execution and a continued directness of line resulting from scrupulous care.

Just as formality is associated with the works of man, bounded from the rest of the world by straight lines and the conventions of society, so informality, on the other hand, is affiliated in our minds with the open landscape—the big, the boundless, the free. It is synonymous with the great spirit of Mother Nature.

And as we feel it in the larger world, in the same way we are touched by it even in the midst of our communities, in open spaces, whether they are large or small. Where there are such earmarks of nature visible as a hill, a vale, a cliff or a body of water we immediately become aware of the fact that such an area will not conform itself readily to a treatment harmonizing with man-made surroundings, in which there is a predominance of straight lines and circles. Thus in some open spaces we feel disposed and often compelled to preserve the natural attributes of the area. But on some occasions it happens that the treatment to be adapted is open to choice. In such cases oftentimes, by thoroughly screening out the bounding influence of buildings and traffic lines, the natural style may be safely evolved.

Though the informal style may have been adopted, it does not follow that the development must be pursued narrowly and in accord with the notions so generally ascribed in England during the 18th century to naturalistic park advocates by the defenders of the formal style. At that time some insisted that the designer could only lay out a successful naturalistic line of paths and vegetation if he previously prepared himself for the task by becoming intoxicated.

Obviously wine is not the solution of the problem. One must go to nature for inspiration. Perhaps the designer will catch it in the graceful sweeps of the hills and valleys or it may be from the careless yet artful disposition here and there of tree and shrub masses. He must apprehend and apply the spirit of the



YARDS LIKE THESE CALL LOUDLY FOR THE AESTHETIC TRAINING THAT PARKS SUPPLY

open with sufficient adaptation to the wiser needs of man and to man's capacity for enjoyment.

In the construction of the paths and roads he will make them subservient to the topographical promptings of the area, and yet withal be guided by the necessities of directness and accessibility to and from all parts of the park.

And finally, when a decision has been made as to the functions of the recreation ground and when it has been divided up in accord with those needs, then follows the problem of what it will be appropriate to plant in the naturalistic park thus planned.

How an Informal Park Should Be Planted

A full-dress suit is patently out of place at a barn dance. And in like manner formality of treatment and indulgence in geometrical fantasies are out of place in a natural park.

Yet this seems commonly to be misunderstood in the anthracite region. In one of the larger city parks—the important park of Nay Aug of Scranton, Penn., by the way—there is an illustration of this confusion of formal and informal treatments. Close by the entrance of that park, which is so fundamentally natural in character, are found a moon and stars and some other geometrical curiosities, which are so placed as to be the embodiment of poor taste and disharmony. Of course some visitors admire them just as many foreign women like certain discordant combinations of colors until they are taught to prefer those which are more harmonious.

If the public is once familiarized with the beauty of flowers arranged with due reference to their harmony and effect in mass and if it learns how they may be appropriately used, it will thenceforth no longer view with complacency any obvious incongruity in the laying out of parks.

So much for mere confusion in planting, as opposed to a natural scheme along informal lines. Now let us consider rather what natural planting is and how it may be used appropriately.

One need scarcely be told what natural planting is like. All of us have wandered sufficiently over meadows and along country roads to have recognized it before this. For example, we have seen familiar trees either in masses or scattered here and there, singly or in groups, over the face of the landscape. We have seen the shrubbery masses tiding over the gap between tree top and ground or artistically grouping themselves along the fence row, and the vines with a perfect riot of grace and freedom intertwining with the shrubbery or draping themselves fantastically over the stone walls or clambering up into the very trees.

Most of us indeed are thus familiar with nature's way and hence are able to judge the successful from the unsuccessful naturalistic planting. Let us, therefore, see in turn to what ends such characteristic planting may be directed within the bounds of a naturalistic park.

In the first place, it may function as a screen to shut out undesirable things, such as, for example, unpropitious views or unpleasant surroundings, and even the unsightly park boundaries themselves. Often to be able to conceal the boundaries so as to increase the apparent extent and size of the area is a particularly desirable feature.

Also, planting may serve to "screen in" things, or may contribute in composition toward a more successful view, and may function as a background, or even as an object of beauty in itself.

And last of all, planting may contribute toward the life and interest of the park. The cornelian cherry in early spring, the shad bush or the golden bell, the changing colors of the tupelo or of the sugar maple in the fall, or the interest of bark and habit of cornels, kerria, and birch in the winter, or the shimmering leaves of the poplar and the swaying branches of the maples in summer—all of these may add their quota of interest and life and may contribute peacefulness and rest to the seasonal career of a park.

Summation of Necessary Elements in Design

In general I have observed, therefore, that a park, large or small, should have recreation in one or more of its forms as the foundation stone; that exertive recreation of the people may be promoted on the one hand or receptive recreation on the other; and that unless indeed the park becomes thoroughly useful with respect to the function it is to serve, it can neither be wholly beautiful nor in turn entirely successful.

Two general styles of park development have been evolved and are appropriate under separate circumstances. They are the formal and informal types and remind us that park creation is not such a vague, approximate art after all, but rather a reasonable, practical and esthetic one. Henceforth we need not, therefore, just expect our parks to happen. An unreasoning and hit-or-miss attempt at development clearly should no longer suffice.

The people of the coal region are awakening to the need of parks. Consequently the problem for the present is not so much merely how to arouse the people to park development as how to arouse them to development along the proper lines. If we may successfully blaze the way in this direction, then indeed there will result more adequate and effective provision for leisure-time enjoyment in the anthracite region, which inevitably will signal the day of happier, healthier and more efficient men and women.

Explosibility of Carbide Lamps

In Miners' Circular No. 18 of the United States Bureau of Mines, entitled "Notes on Miners' Carbide Lamps," the following suggested rule appears: "Never use carbide in a lamp made of copper; the lamp may explode." This drastic recommendation led *Engineering and Mining Journal* to ask the Director of the Bureau of Mines for what reason the rule was formulated.

The director replied that James W. Paul, author of the circular, was informed of an instance wherein a carbide lamp made of copper exploded, presumably due to the presence of copper acetylide. The circumstances, as related to him, were that the lamp was placed on an anvil and struck with a hammer and an explosion resulted. The precautionary rule to which reference has been made was suggested because, under similar conditions, a carbide lamp made of copper might explode if a rock or a chunk of coal were to fall on it, particularly if the lamp had been placed on the floor of an entry or room in the mine.

Several textbooks claim that when acetylene gas is passed through an ammoniacal solution of cuprous chloride, a reddish-brown precipitate forms, having a formula of $C_2H_2Cu_2O$, and they add that when this precipitate is dried, copper acetylide (C_2Cu_2) is formed, and that this compound, when heated between 50 and 90°, forms a highly explosive mixture. The Bureau of Mines has made no detailed investigations in this matter, and it of course cannot state definitely the possibilities of an explosive mixture being formed when acetylene gas is passed over a copper plate, such as has been used in the manufacture of carbide lamps. This question is still in controversy.

VIEW ALONG GANGWAY IN PINE HILL COLLIERY, MINERSVILLE, PENN. NOTE PITCH OF SEAM

New Departure in Briquetting

The matter of cheap fuel is one of the most important questions in this country today. The continued high prices of anthracite coal for both domestic and steaming purposes and the prospect of a still higher price have forced to the front the old question of utilizing the slack and waste product of the mines. Repeated efforts have been made during the past 25 years to put this waste product in marketable shape. These efforts have so far met with such indifferent success that the boulet (or briquette, as it is generally known) is a rather discredited article.

To make the particles of coal adhere, a binder must be obtained that has the following qualifications: It must be a combustible material; it must not produce a product that will disintegrate in transit or in the fire; it must be waterproof and capable of withstanding the action of the elements; it must not give off noxious gases or odors in burning; and, lastly, it must be marketable at a price to compete with the standard grades of anthracite. The Belgium Coal-Fuel Co. claims to have a binder that meets all these qualifications. It is fully covered by patents.

The past failures in briquetting have not only been due to an inadequate binder, but also to the method of preparing the raw product, the vital burning qualities of the coal being seriously decreased in the process of manufacture. The Belgium company claims that it has been able to overcome these losses by a new crystallization process, which is also fully covered by patents.

Knowing the adverse criticism it was bound to meet from the fact that the article was discredited, the Belgium Coal-Fuel Co. took over the plant of the American Boulet Co., at Phœnix, Md., remodeled it to suit the company's requirements and is today producing and marketing a product that is a recognized substitute for anthracite coal, at a much lower price.

Extracts from a Superintendent's Diary

The Democratic campaign committee of our county paid me a visit today apparently for the purpose of offering me a place on the county board of education, but in reality they came to find out whether I intend to vote the Democratic or Republican ticket at the next election. I have always taken an active interest in politics, but I am not a party man and the politicians say I will not "stay put" and they cannot depend on me in a party crisis. Consequently, each year I am honored at least to the extent of visits from committees representing each party, and very often they throw out vague hints suggesting that they have unfilled "slates"; they are always careful, however, to suggest for my consideration offices that they feel sure I would not accept.

It just happens that in the forthcoming state election I have no reason for giving either party the preference, and as I saw the committee approaching, I suddenly decided to intimate that I must be promised "sure enough" honors before pledging my influence to either party. With that in mind I allowed the committee opportunity to throw out as many hints as they deemed advisable, and then suddenly threw them into confusion by becoming, to all intents, very much interested in one of their supposedly frank offers of a place on the county board of education. In all my experience I have never seen men so quickly put out of countenance; they had encountered unforeseen circumstances and were entirely at sea. To make preëlection promises that one has no idea of fulfilling requires little imagination, but to win a man's vote by promising him a reward that must materialize before the election requires more than imagination.

The man who had acted as spokesman of the committee up to this point suddenly remembered that he was to see our commissary manager while on this trip and excused himself, remarking that he felt sure that his companions were competent to discuss the political situation fully with me.

Fearing that any further attempt on my part to press my claims for party recognition might embarrass the entire committee possibly to the point of silence and not wishing to terminate the interview without getting an expression from them on several matters led me to change the subject. I wanted to learn why some men always escape jury duty and how others succeed in having their tax assessments reduced, and many other similar curious inequalities in the everyday affairs of men.

The entire committee waxed enthusiastic the moment I let it be known that I had observed that some men had a way of pulling strings, as it were, and that to very good purpose; a man wouldn't be considered a good citizen unless he looked out for his friends and why shouldn't a good party look out for its friends was the way they put it. Seeing that I did not balk at the suggestion, they carried the argument to its logical conclusion and wound up by assuring me that in the future they proposed to see to it that my personal interests received the attention that my party service justified.

As they progressed with their promises, they became so confident of my complete capitulation that they began to discuss details of the coming campaign in our camp and assured me that they felt sure we would carry the beat "hands down." Well, perhaps we will carry the beat, but as I refused to commit myself in spite of all of their enthusiasm, "we" is of unknown party as yet.

Government vs. New York City Specifications

The United States Government specifications are naturally much more elaborate than those recently proposed for New York City, but at the same time they are based on a simpler and, it would seem, a more equitable principle. The Government pays for its coal according to its heating value; that is, it pays a price which is proportional to the value received. It fixes a standard, it is true, but allows some little variation from this standard without entailing a penalty, and when penalties are imposed they consist simply of reductions that vary directly according to the value received.

The new city specifications also fix a standard, but no variation is allowed. For variations greater than those which would be neglected by the Government, penalties of double the loss in value received are imposed. In addition to this, double penalties are provided for the presence of excess ash, which, in the Government's specifications, carries little or no penalty beyond that resulting from its detracting effect on the value of the coal.

Recognizing the fact that the presence of ash causes a reduction in the heating value of the coal, the Government has two general standards by which it judges the value of a coal—an ash standard and a B.t.u. standard. Domestic sizes of anthracite are purchased according to the ash standard, it having been established to the Government's satisfaction that the heating value of such coals varies inversely as their ash contents. Steam sizes of anthracite may be purchased either under the ash standard or the B.t.u. standard. Sometimes a combination of the two is used, as in the case of power house sizes of anthracite, but in such cases the added penalty for the presence of excess ash is quite nominal as compared with the penalties proposed by the New York City specifications. In the case of bituminous coal, the Government requires the bidder to guarantee the heating value, ash, moisture, etc., but the reductions in prices paid for coal which falls below the guarantee are proportional to the value received.

The new city specifications require buckwheat No. 3 to possess a heating value of 12,400 B.t.u. per pound and not to contain more than 16 per cent. ash. The old city specifications allowed a 19 per cent. ash content and required a heating value of only 12,000 B.t.u. Buckwheat No. 3, which would have met the old specifications, will be penalized 3 per cent. for ash and 5 per cent. for lack of heating value.

With the same standard under the Government specifications the coal would only be penalized 1 per cent. For a variation of 2 per cent. in heating value no penalty would be imposed, so that with a required standard of 12,400 B.t.u. per pound, the penalty would be inflicted simply on a lack of 152 B.t.u. per pound, which would amount to a reduction in the price paid of only 1.226 per cent. The city's penalty would then be 6½ or 8 times that imposed by the Federal Government.

An almost equally striking difference in equity of the two specifications is apparent in a transaction involving the sale of bituminous coal. A consignment of slack might be shipped that analyzed 15 per cent. ash, 13,000 B.t.u. per pound and moisture, volatile, etc., in such proportions as to incur no penalties. Such a coal would be a fair grade product and not an unusual shipment, but it would contain 600 B.t.u. per pound less heating value than required under the New York City specifications and 4 per cent. excess ash. It would therefore be subject to a penalty of 5 per cent. for the excess ash and 9 per cent. for the lack in heating value.

Offered to the Government, the same coal would be taxed but 4 per cent. under the ash standard; or if judged according to the B.t.u. standard the penalty imposed would be only 2½ per cent. A 2 per cent. variation in heating value would be allowed without penalization, so that the reduction in its value would be computed on a lack of only 340 B.t.u. per pound in heating value.

If the Government specifications have resulted in an actual saving in the Federal coal bill, as claimed, it has been because the specifications have been equitable and impose no undue hardships upon the dealers supplying the coal. Such being the case, multiplying the severity of the penalties several fold, as is proposed by New York City, could only have one result and that would be a very marked increase in the price that would have to be paid for coal. A saving can only be realized when all parties to the transactions are treated fairly and equitably.

Truesdale Breaker

The Truesdale breaker of the Delaware, Lackawanna & Western Railroad Co. is being rebuilt. This is one of the largest breakers in the anthracite district and will be remembered as the first continuously to exceed a production of 1,000,000 tons in a year. Even with this large output only one-half of the breaker has been operated. Woodward really was the first breaker to prepare over 1,000,000 tons in a year, but the one at Truesdale has prepared more than 1,000,000 tons for three successive years, which is an exceptional accomplishment. It was built of wood, but is being remodeled into a steel structure. As the whole breaker is built in parallel halves, it is possible to remodel one side without disturbing the other. When the work is completed the breaker will closely resemble that at Loomis, which is entirely of steel construction and inclosed in glass. Its capacity will be about 8,000 tons per day.

Anthracite Notes

The Scranton Electric Co. Is Completing a Shaft for the purpose of flushing the ashes from the boilers into the mine workings under its Green Ridge plant. This is a large and uptodate plant that furnishes power and light, and in the cold months of the year it heats the hill section of the city with exhaust steam. By means of induced draft it is able to use culm from a rejected washery pile and refuse from the breakers. Heretofore the ashes have been washed into a pit, loaded on cars and hauled away by the Delaware & Hudson R.R. By means of the shaft the company plans to dispose of its ashes and at the same time support the surface on which the plant stands.

The City of Scranton Recently Put Down a Borehole to flush ashes into the Peoples Coal Co. workings in Hyde Park. The damage due to caves is extensive in that part of the city, owing to the company's removing the pillars in the surface beds. These latter are the beds that need the flushing at this time and not the ones below them. When the beds are flushed the coal company can safely remove the pillars under the town. The latest move is to have the Scranton Water Co. furnish water for the purpose, it being to the company's advantage to hold up the surface and so protect its water and gas pipes.

The Delaware, Lackawanna & Western R.R. Co. will abandon the custom of free repairs to houses damaged by removing pillars in the surface beds on the south side of the City of Scranton. The company proposes to sell the pillars for an average of $200. Exceptions will be made to home owners who cannot afford to make repairs after caves. The general repairs the coal company has been making heretofore included the strengthening of cellar walls and the shoring up of damaged buildings. Since the cover rocks are thin, it appears as if a few cement pillars or steel-pipe props would be all sufficient for this work.

An Interesting Piece of Work is progressing under the armory in the Pine Brook section of Scranton. At this place J. H. Rittenhouse went into the mine and commenced to underpin the building after the cave occurred. The results have been satisfactory, and the large building will not be destroyed. It is now being used by the 13th Regiment for drills, and recently 6,000 danced in the building. A more trying test of the strength of the underpinning could hardly be imagined.

When the European War Broke Out, the Pinghsiang colliery of the Han-yeh-Ping Iron and Coal Co., Ltd., was being engineered by a German. This gentleman was "persona non grata," and the colliery was turned over to S. Ken Huang, who is now engineer in chief. Mr. Huang is a recent graduate of Lehigh University. He writes: "We have two shafts and a main adit, through which we produce 3,000 tons of coal per day. We are making preparations to sink two more shafts, with a view to increasing the output to 5,000 tons per day."

The Maximum Recovery of Benzol per Ton of Coal is about 3.7 gal. of crude, or 65-per cent. benzol per short ton of coal. This can only be obtained under favorable circumstances. W. J. A. Butterfield gives 2.41 gal. out of the nonvolatile residues and 0.13 out of the volatile products, or 2.54 gal. in all.

The Labor Situation

General Labor Review

The anthracite region is gradually settling down to the new contract, except in the Panther Valley Section, where the contract miners resent being compelled to stay in the mine until the day's work is done.

In western Pennsylvania 50,000 men are on strike because the new district contract is not as favorable as the McAlpin agreement led the men to expect. The mine workers think that because changes are made in the powder and house-rent charges a clause in the McAlpin contract is violated. It reads thus:

All internal differences are hereby referred to the various districts for settlement, with the understanding that only by mutual consent shall anything be done in district, subdistrict or wage-scale conventions that will increase the cost of production or decrease the earning capacity of the men.

May Mutual Consent Be Sought by a Strike?

"By mutual consent" an arrangement has been made reducing the earning power. It is not in violation of the McAlpin agreement, but the concession certainly should not have been made by the leaders of the miners. A committee has been formed to oust the present leaders and rescind the contract. The latter action would be clearly contrary to the agreement made at the McAlpin Hotel, as "mutual consent" has been obtained for the modification in earning power.

The strike will probably not last, as it is about a minor matter, and the union will not lose its membership. But the organization is weakened in prestige by just such misunderstandings as this. No wonder no one wants to sign up with it.

In eastern Ohio a settlement is now assured. Gloom suddenly gave way to gratification. The operators made liberal concessions relative to arbitration. Ohio has now arrived at a final settlement in every district.

Situation in the Lesser Coal-Mining States

In the southwest the operators refuse to discuss a scale with the miners till they comply with the old agreement, and they adjourned at Kansas City without coming to any conclusion. Strip-pit scales are under discussion in Indiana. Iowa has decided on a scale, and in western Kentucky the worst anticipations have signally failed of materialization. Nine companies have made settlements with the miners on the basis of last year's agreement. Leading among these companies is the Central Coal and Iron Co. of Central City.

In the northeastern part of West Virginia the mines have generally granted a 5 per cent. further increase and peace is now assured.

In the Belleville district of Illinois it was expected that the miners would reject the agreement when it was presented to them in a referendum, but they are voting in its favor. As a result they will get an increase in wage equal to that of other mine workers in Illinois; and as the Belleville district is hard put to keep in operation, many of the men will work on extremely short time and find it hard to make a living.

Trouble in Anthracite Region

There are differences all over the anthracite region between capital and labor despite the fact that an agreement has been signed and that that agreement has been submitted to the men in a convention and accepted by them. This discontent of the miners occurs in the face of an increase in wages which it is reckoned will amount to $11,900,000 a year.

Only in part is the difficulty even remotely due to the fact that the agreement failed to be specific as to the hours at which the mines shall commence work. If that were the cause of the disagreement it could and should have been carried without cessation of work to the conciliation board, as the contract clearly provides.

But this is not the only difference between the operators and mine workers. It is put prominently forward because it is the least dishonorable cause the mine workers can find for violating their contract. The real cause of the agitation is rather against the contract as made and provided than against certain rearrangements which the contract overlooked due to its hurried writing in the final stages.

It is not whether the men shall work from 7 a.m. till 3:30 p.m., but whether they shall work as many as 8 hr. in their working places. This last dispute is one involving the binding force of a contract just signed, and the operators cannot for one moment admit that it is open to discussion.

Labor Trouble from Carbondale to Shamokin

The trouble is widespread. In the northern tip of the northern field at the Powderly and Coalbrook mines of the Delaware and Hudson Co. the drivers are seeking an 8-hr. working day. They have been notified that they must be at the barn at 5:45 a.m. and have their mules ready to leave the barn at 6:15 a.m., so as to be at their places by 7 a.m.

The mines are at various levels about the hills surrounding Carbondale and some of the openings are a long way from the stable and much time is consumed by the drivers in reaching their working places. The company views it probably as not at all reasonable that it should pay the drivers for riding to their work. A city firm would not think of paying its clerks for the time spent by them in traveling in street cars and railroads to the company office.

Nevertheless it might well be argued that some of the drivers would sooner go direct than report at the stable, and would of course sooner not harness and prepare their mules for the trip. This is a viewpoint reasonable enough if it were not for the fact that the requirement is "specified in the bond," and any objections they may have should be postponed for four years hence, when another contract is to be made.

How the Mule Drivers View the New Contract

Coming down south two collieries of the Lehigh and Wilkes-Barre Coal Co. were laid idle on Mar. 11 because of the dissatisfaction at the 8-hr. provision. These were the Maxwell colliery at Ashley and the Wanamie colliery. Two thousand men were made idle. Only May 17 the men at the Hollenback colliery of the same company went on strike. On May 19 the employees of the three collieries returned to work. The drivers claim that an 8-hr. working day at the working place is a longer time to work than a 9-hr. day with time allowed for traveling to and from the working place.

The Delaware, Lackawanna & Western Railroad Co. Coal Department, appears to have men who loyally abide by their agreement whatever they may think of its provisions. It is a contract, and that is enough for them. The company has set the starting hour at 7 a.m. and the quitting time at 3:30 p.m., with half an hour for dinner.

At the Mineral Spring colliery, Parsons, Penn., Thomas Holland, one of the drivers, was ordered to make another trip with a car at 2:30 p.m. He refused, saying that it would make it inconvenient for him to leave the mine when the quitting time arrived. The next morning the drivers, having heard that the man was discharged, decided to go on strike for his reinstatement and the mine was laid idle. On the same day 800 men at the Henry and Wyoming shafts quit work to compel the company to permit a virtual rewriting of the contract by which the 8-hr. day would be figured from "bank to bank."

Panther Valley Men Have the Strike Fever

But the place where the agitation is the most severe is the Panther Valley, where the Lehigh Coal and Navigation Co. has its mines. The trouble here is aggravated by the knowledge of the men that they can get work at the munitions plants at Bethlehem and Easton with the most liberal of wages.

The strike against the new contract lasted almost from the time of the conclusion of the Pottsville convention till May 20, when by a referendum vote of seven to one the miners decided to go back to work. Thus ended a three weeks' strike on Monday, May 22. But after a day's work the miners to the number of 1,200 came out on strike again as a protest against the decision of the company that it would not hoist contract miners until they had spent 8 hr. underground unless the inside bosses sanctioned the return of the men to the surface. A strike of 7,000 other mine workers is expected.

On May 15 the Cameron, Bear Valley and Locust Gap collieries were reopened after a 7 days' strike and 2,000 men and boys returned to work. This suspension was because of the new 8-hr. provision. The dispute between the company and the mine workers is to be presented to the conciliators. The Natalie colliery of the Madeira Hill Co. at Shamokin went on strike, laying 500 men idle on May 13.

Machine-Shop Employees Strike for Increase

The machinists, yard and foundry laborers at the East Market Street shops of the Delaware & Hudson Co. struck on May 16, but on May 17 they were all back at work. This strike was not unreasonable. The men do not work at the mines but for them and so did not come under the scale. They were willing to work 9 hr. if they could get the allowance for the time worked. The company settled with them, giving them a 15 per cent. increase in wage and not reducing their hours. They were well satisfied with the arrangement.

In Some Cases 8-Hr. Day a Gift of Ashes

It appears that the 8-hr. day was in some cases a gift of ashes. The bituminous 8-hr. day, long declared to be so favorable to the men of that region, was hardly as liberal a provision as many of the drivers in the anthracite region already possessed. The drivers are beginning to realize that fact with bitterness.

The reckoning may some time later be made from the stable to the stable or from the mine mouth to the mine mouth, and when that is done the company which provides the most rapid means of moving the men to their work by placing stables handily and by transporting its men with efficiency to their working places will be awarded by a saving of money. The contract is a sacred thing and should be observed, but one cannot help realizing that the companies in their provisions are placing themselves where they receive no reward for a generous consideration of their employees' interest.

The Lehigh Coal and Navigation Co. has rightly conceded the 7 a.m. starting hour. This is not an unreasonable concession. In fact there seems to have been little reason for refusing it.

The Industrial Workers of the World have failed in their endeavor to keep the men idle at the Marshwood colliery of the Moosic Mountain Coal Co. After a strike of nearly two weeks, the union finally got the men to return to work. At this mine the trouble was not over the contract provisions. The mine workers, who are I. W. W. men, repudiate any and all contracts. They strike whenever they have any hope that they may win.

Anthracite Stripping Scale Yet To Be Settled

The stripping employees who are not covered by the general agreements are demanding an 8-hr. day and a 20-per cent. increase and have been holding a conference with their employers, who claim that they cannot revise their wage scale unless they can obtain a revision of the contract with the corporations for which they are extracting coal.

The stripping operations at Ebervale, Harleigh, Buck Mountain, Beaver Meadow and Coleraine have been discontinued owing to a strike. The stripping company refused to reinstate two men who had been discharged and 800 men quit work and were paid off by the company. Seven steam shovels in the Hazleton coal fields have been rendered idle because the men who worked in connection with them have left to take jobs in the munitions plants.

Seceders May Wreck Union

Around Pittsburgh there is much dissatisfaction with the new scale. Twenty-seven coal mines, 14 of which are operated by the Pittsburgh Coal Co., have quit work. The 13 other mines are owned by independent companies.

Objection is not taken to the McAlpin agreement but to the subsidiary district contract. A committee has been formed to urge a special district convention. In the announcement made by that committee it is asserted that the sentiment of the miners in 56 locals of the district expressed by a vote at a mass meeting held in Charleroi, Penn., Sunday, May 14, was that the Pittsburgh district contract "is a complete surrender of all that was gained for the miners in the New York agreement."

Special Convention to Oust Labor Leaders

The feeling is extremely bitter and centers about the rates charged for coal and house rent in the arrangement with the Pittsburgh Coal Operators' Association. The special convention is to be held not later than June 12, and the committee hopes to convince the union mine workers in district No. 5 that the men have been betrayed by their officials. They desire to have them ousted and to have the contract which they made rescinded.

At the Manown, Gallatin and Sunnyside mines of the Pittsburgh Coal Co. the miners object to the increased price of permissible powder and fuse caps. The price has been 5c. per stick, there being three sticks to a pound. The charge for this powder has been increased to 17½c. per lb., a rise of 2½c. on three sticks.

The companies for the most part have met the increased cost of powder without raising the rate to the miners. The latter most unjustly say that the Pittsburgh Coal Co. is trying to get back what it loses in wages by increasing the price of powder. This is grossly untrue. But there is this to be said: The companies should never make contracts by which the men's wages are cut by an increasing charge for powder.

Why Price of Powder Should Be Kept Constant

Most of them object to raising wages to compensate the miners for the increased cost of explosives, and they are right. Wages raised are never lowered. Most of the operators prefer to sustain a loss on the sale of powder, which they feel adjusts the matter just as effectually and which provides automatically for readjustment as soon as the cost of powder declines. This appears to be the attitude of the Pittsburgh-Westmoreland Coal Co. at Acme and Van Voorhis along the Pigeon Creek in Washington County. The price of powder at these mines has not been increased despite the higher rate charged by the powder companies.

One operator in the Pittsburgh district estimates that only 15 per cent. of the mines in the district are at work. It would be most regrettable if the union were to break up on this small matter and still more if it were to rescind a solemn agreement like that signed. Good faith is at the basis of all progress. The companies could hardly bind themselves and leave the miners free, for faithlessness is apt to grow. Once the men as a body have broken their obligation, no reliance could be placed on them in the future.

Western Kentucky Conference

The western Kentucky conference was one long and fierce struggle, so that at times it appeared as if the mine workers in their extremity would be compelled to accept a decreased instead of the increased wage which was secured in other sections. This discouraging state of affairs was brought about by the nonunion operators, who had so cut the wages of their men that it was impossible for the union operators to successfully compete in the market.

The operators hoped to be forehanded with their settlement and believed they might induce the miners to meet them before the McAlpin agreement was written. They regarded western Kentucky's need as so peculiar that they hoped it might be settled without any reference to what was happening elsewhere.

Why Western Kentucky Is a Law Unto Itself

Nowhere is nonunion competition so strong and so progressively active as in western Kentucky. As one nonunion mine operator has put it, "I found my negro workmen quite reasonable. When I told them that a reduction in wages would give them steadier work and therefore better earnings they readily comprehended the argument and approved the change." These reasonable men have made it impossible for the operators who do not employ them to work with any regularity.

Oscar Smith during the Indianapolis convention said that in one county of Kentucky nonunion miners load a room of coal, about 22 tons, for $1.70, or at a rate of about 8c. a ton. Just across the line in the next county, he said, union miners get $5.50 for the same work. If these are facts, his conclusion was correct that the union in that section was likely to be destroyed. The union operators of western Kentucky in a public statement recently said:

> From 1912, the year in which we made our last advance in wages, till 1915 inclusive, organized labor in our territory lost to the competitive nonunion fields, by which we are surrounded, an aggregate tonnage of 2,858,000 tons. This loss, as we see it, is directly traceable to competitive labor conditions.
>
> The loss was 445,000 tons in 1912, and in 1915 it reached 1,133,000 tons, which roughly estimated represents a loss to the miners in our employ of $1,750,000. This money under a wage scale which would have permitted us to compete would have been held in our territory.

It was in face of arguments such as these that the conference met. Was it remarkable therefore that the miners soon agreed to accept last year's labor rate? The operators reduced their demands from a 20-per cent. decrease to one of 10 per cent., and then agreed to pay last year's scale; but there was still a difference of opinion as to mining conditions.

Miners Wanted Same Increases as Elsewhere

The miners awaited the meeting of the policy committee in Pittsburgh before they went into conference and thereby showed their intention of standing with the unions in the other states despite their own desperate position. However, the conditions stated soon made them modify their position and they were glad to get last year's scale.

The scale committee that was appointed by the operators was as follows: T. P. Wright, of Bevier; C. W. Taylor, of Greenville; J. A. Smith, Ed. Holt, John Bastian and H. Tucker, all of Central City, and W. W. Bridges, of Drakesboro. The workers' committee consisted of President Robert Pollock, Secretary H. H. Vincent, Vice-President W. W. Duncan, International Board Members George Baker, John T. Maine and Richard Baker, of Beaver Dam; W. C. Hopgood, of Henderson; John Render, of Graham, and West Ames, of Dekoven.

Conference Comes to an Indecisive Close

The conference agreed finally on Friday, May 12, to adjourn without appointing any day for reassemblage. At the close of the meeting a strike of all the 6,000 men in the district was called to begin May 16. The companies countered this stroke by issuing a notice that all the mines of the Western Kentucky Coal Operators' Association would be closed on that date. Eighteen companies responded.

The union leaders had informed the operators that the miners would report daily for work and offer to resume on the old basis; that they would permit the necessary number of men to work to maintain the physical condition of the properties, but that they could not accept the proposals of the operators.

The latter offered to submit four points to arbitration, but the miners declined the invitation. The coal-mine owners want each two miners to work in three rooms instead of one in two rooms. They also want a system of docking for those who load impurities and a change in the method of paying for dead work. They urge that these changes would not result in reductions in earning power, but the miners insist that they would. The two-men-in-three-rooms provision was the chief point of difficulty as far as laboring conditions were concerned.

Later reports show that nine companies have made settlements with the miners on the basis of last year's agreement. The largest of the companies so signing is the Central Coal and Iron Co., of Central City. This company signed, however, before May 16, not being a member of the Western Kentucky Mine Operators' Association.

Ohio Has No Labor Troubles

It looked for a while as if eastern Ohio would have a general strike. The details of that district's settlement have been bitterly contested in Cleveland and later in Wheeling, the conference lasting from Apr. 18 till May 11 and ending in more or less of a deadlock. The scale committee of the miners would go no farther till they had met the men and ascertained their sentiments.

So on May 12 an official call was sent out by the subdistrict headquarters assembling the miners on Mar. 20 at Bellaire, Ohio. The meeting was held in executive session and details of it are hard to obtain; but apparently the mine workers were unfavorable, to say the least, to the embodying of any part of the old arbitration clause in the present contract.

Dispute Was About Compulsory Arbitration

The miners regard that clause, known as No. 4, as too long and too full of red tape. The operators were willing to see the clause simplified, but opposed its nullification. The stiff stand of the miners appeared, however, to convince the operators that only by concession could the miners be appeased. A strike, or rather a suspension, looked imminent.

It is true that the union could hardly support a strike, as it would be contrary to provision No. 6 of the McAlpin agreement, which requires "mutual consent" for any changes in the "existing contracts." A strike would be clearly a violation of the agreement, but it is only in degree different from the duress which the miners have brought on the operators to compel them to relinquish clause No. 4 of the old agreement. Compulsory arbitration for both sides is the surest and fairest way of securing industrial peace, and it is a pity that it lost the day in eastern Ohio.

Operators Suddenly "Face About" on Clause 4

The miners' convention adjourned to meet again May 22, but meanwhile on May 19 the conference between miners and operators resumed sessions and came to a happy conclusion. The meeting lasted till 10:30 p.m. and was then adjourned to meet again in Cleveland at 10 a.m. on Monday, May 22, when the final arrangements were made. It is said that under the new agreement internal disputes will not be submitted to a board of arbitration but will be adjusted by the state officials of the union and the owner of the mine at which the grievance occurs.

The representatives of the miners and operators in the Jackson field, which comprises Jackson, Vinton and Gallia Counties, reached an agreement last week at their meeting in Wellston, Ohio. There were no serious differences to be settled and the contract has already been approved by the miners. Work will soon be started at several of the mines of the district.

Situation in the Southwest

As stated last week, the mine workers and operators of the Southwest met at Kansas City on May 15 to establish a new wage scale. The operators questioned the propriety of treating with the men in view of the fact that the present contract had been so frequently violated by the mine workers. They instanced many such violations and insisted that these cases be adjusted. When that is done they agree to meet the miners.

The miners were unable to reply to the demands of the operators and requested an adjournment until May 29. To this the operators agreed. The meeting will be held at Kansas City.

Operators Refuse Even To Discuss Agreement

The statement of the operators to the union members of the Interstate Joint Conference Committee at Kansas City was as follows:

In accordance with section 22 of the Interstate Contract we have assembled for the purpose of negotiating a new joint agreement, but at this time we find ourselves confronted with a number of cases which we consider in flagrant violation of the present contract and our association questions the propriety of undertaking to make a new agreement until we can be assured of the enforcement of the present document.

The prominent cases to which we desire to call your attention and of which a settlement in accordance with the terms of the present contract is demanded are as follows:

In district 21 the case of the four entrymen on strike by order of the district officers at the mines of the Whitehead Coal and Mining Co., Henryetta, Okla., and the other similar cases entitled to adjustment under section 1 of the Interstate Agreement.

In district 14 the shutdown at mine No. 49, Central Coal and Coke Co., the refusal to adjust the same in accordance with section 1, Interstate Agreement; the shutdown at the Besse-Cockerill Co.'s strip mines while the case is in the hands of the district joint board, and the shutdown of the Wear Coal Co.'s mines and those of the Western Coal and Mining Co., with the intent and purpose of taking from the companies the management of the property. These violations in district 14 involve about 3,500 men, all of whom are still on strike.

The association insists that before continuing its negotiations for a new agreement these men be put to work and the cases be taken up for adjustment, all of which is in accordance with section 1 of the present contract. This will demonstrate whether the miners are sincere and honest in their support of the present Interstate Agreement. When such action is taken, we stand ready to meet your committee and continue our negotiations.

Miners Make Unauthorized Changes in Board

The operator members of the Oklahoma joint board appointed by the Southwestern Interstate Coal Operators' Association have refused to meet with the miner members. The board met at McAlester, Okla., on Thursday, May 11, and the operators refused to sit with the board because William Dalrymple, of McAlester, had replaced John Wilkerson, of Thurber, Tex., district president of the miners. Wilkerson is an ex-officio member of the board.

The miners declared that unless the operators met their representatives the district union would call a strike of every miner employed in a mine the operators of which belong to the association. If this threat is carried out, 10,000 will be affected in Oklahoma, Arkansas and Texas.

Marine Engineers' Strike Over

The strike of the tugboat engineers (recorded in "Coal Age" on p. 842 of the issue of May 13) which has caused much trouble in the New York harbor for the past few weeks has been practically ended by the acceptance of the engineers of the terms they rejected more than two weeks ago. These include the increase in wages asked by them, a week off every year with pay and two days off a month. The men wanted a day off each week.

Most of the towing companies have all their boats in operation, but it is expected that in a few more days shipping conditions will have become normal and all companies will be operating their full complement of vessels.

Mine Hoist Calculations--II*

By F. L. Stone†

SYNOPSIS—A balanced slope haulage engine operating "gunboats" is considered. Each step in the calculations governing the determination of the proper size of motor is carried through. Electric hoisting is by no means an experiment.

The case for consideration in this installment is that of a balanced slope haul. The example is taken from the anthracite field. The coal is hauled directly from the mine to the top of the breaker. Skips locally known as "gunboats" are used. Each skip holds about two mine-car loads and is self-dumping at the head of the breaker. This method of handling means an additional dumping of the coal, but in some instances has enough advantages to offset the resultant breakage.

The slope the profile of which is shown in Fig. 1 has two grades—400 ft. on 30 per cent. and 600 ft. on 40 per cent. The hoist is of the double-drum type.

This example has been selected because it will afford an excellent illustration of how simply a rather cumbersome problem can be solved by the moment method.

The conditions under which the hoist operates are as follows:

Tonnage in 8 hr.	3,150
Coal per trip, tons	9
Weight of gunboat, tons	6
Diameter of drums, ft.	8
Size of rope, in.	1⅜
Rest period, sec.	12
Effective weight of rotating parts of hoist at rope center, lb.	50,000

Rate of hoisting should be based on 7 hr. to allow for inevitable delays.
For angle of slope with horizontal, see profile.

*The first article of this series was printed in "Coal Age" of Dec. 4, 1915, Vol. 8, No. 23.

†Schenectady, N. Y.

Trips per hour, $\frac{3{,}150}{7 \times 9} = 50$

Time of trip, $\frac{3{,}600}{50} = 72$ sec.

Running time $72 - 12 = 60$ sec.

$t_a = 12$

$t_r = 8$

$$V = \frac{1{,}000}{60 - \frac{12 + 8}{2}} = 20 \text{ ft. per sec.}$$

Total haul = 1,000 ft.

$$\text{Total turns of drum} = \frac{1{,}000}{8 \times \pi} = 39.7$$

$$\text{Total turns of drum on 30 per cent. grade} = \frac{400}{8 \times \pi} = 15.9$$

$$\text{Total turns of drum on 40 per cent. grade} = \frac{600}{8 \times \pi} = 23.8$$

$$\text{Revolutions per second of drum} = \frac{39.7}{60 - \frac{12 + 8}{2}} = 0.794$$

UPLOAD MOMENT

At	0 turn	(18,000 + 12,000) × 0.3 × 4 = 36,000
	15.9 turn	(18,000 + 12,000) × 0.3 × 4 = 36,000
	15.9 turn	(18,000 + 12,000) × 0.4 × 4 = 48,000
	39.7 turn	(18,000 + 12,000) × 0.4 × 4 = 48,000

DOWN LOAD MOMENT

At	0 turn	12,000 × 0.4 × 4 = 19,200
	23.8 turn	12,000 × 0.4 × 4 = 19,200
	23.8 turn	12,000 × 0.3 × 4 = 14,400
	39.7 turn	12,000 × 0.3 × 4 = 14,400

Rope 1⅜ in. weighing 3 lb. per foot is used.
Total weight per side = 3,000 lb.

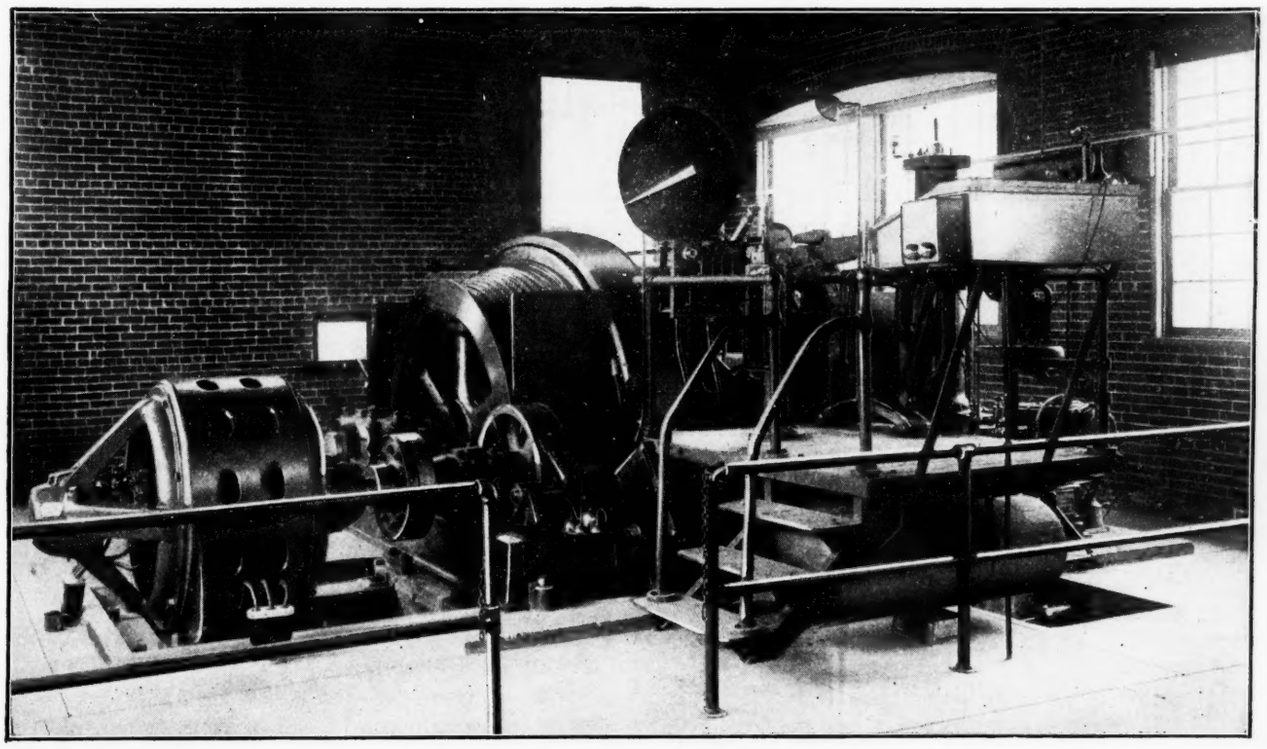


FIG. 1. A 300-HP. ALTERNATING-CURRENT MINE HOIST

Effective weight on 30 per cent. grade = 3 × 400 × 0.3 = 360

Effective weight on 40 per cent. grade = 3 × 600 × 0.4 = 720

Total 1,080

Up rope:

At 0 turn..... Moment = 1,080 × 4 = 4,320
15.9 turn..... Moment = 720 × 4 = 2,880
39.7 turn..... Moment = 0 × 4 = 0

Down rope:

At 0 turn..... Moment = 0 × 4 = 0
23.8 turn..... Moment = 720 × 4 = 2,880
39.7 turn..... Moment = 1,080 × 4 = 4,320

Rolling Friction

The value of 35 lb. per ton of normal pressure to the track will be used. The force of gravity acting on any body on an incline may be resolved into two components at right angles to each other—one parallel to the incline and the other normal thereto. Thus in Fig. 4

a = the angle of incline with the horizontal;
W = total weight of body;
a = the component down the incline;
b = the component normal to the incline.

Completing the parallelogram with W as the diagonal, then $a = W \sin a$; $b = W \cos a$.

In the case under consideration the sine of a on the 30 per cent. grade is 0.3 and the angle is therefore 17° 28′. The cosine is 0.954.

On the 40 per cent. section the sine is 0.4, which corresponds to an angle of 23° 35′, which has a cosine of 0.916.

Hence the weight normal to the slope for the up load is (18,000 + 12,000) × 0.954 on the 30 per cent. section and on the 40 per cent. section it is (18,000 + 12,000) × 0.916.

The down skip on the 40 per cent. section has a normal pressure of 12,000 × 0.916 and on the 30 per cent. section 12,000 × 0.954.

MOMENTS DUE TO ROLLING FRICTION

Up load:

At 0 turn..... $\frac{(18,000 + 12,000)}{2,000} \times 0.954 \times 35 \times 4 = 2,005$
15.9 turn..... $\frac{(18,000 + 12,000)}{2,000} \times 0.954 \times 35 \times 4 = 2,005$
15.9 turn..... $\frac{(18,000 + 12,000)}{2,000} \times 0.916 \times 35 \times 4 = 1,930$
39.7 turn..... $\frac{(18,000 + 12,000)}{2,000} \times 0.916 \times 35 \times 4 = 1,930$

Down skip:

At 0 turn..... $\frac{12,000 \times 0.916}{2,000} \times 35 \times 4 = 769$
23.8 turn..... $\frac{12,000 \times 0.916}{2,000} \times 35 \times 4 = 769$
23.8 turn..... $\frac{12,000 \times 0.954}{2,000} \times 35 \times 4 = 800$
39.7 turn..... $\frac{12,000 \times 0.954}{2,000} \times 35 \times 4 = 800$

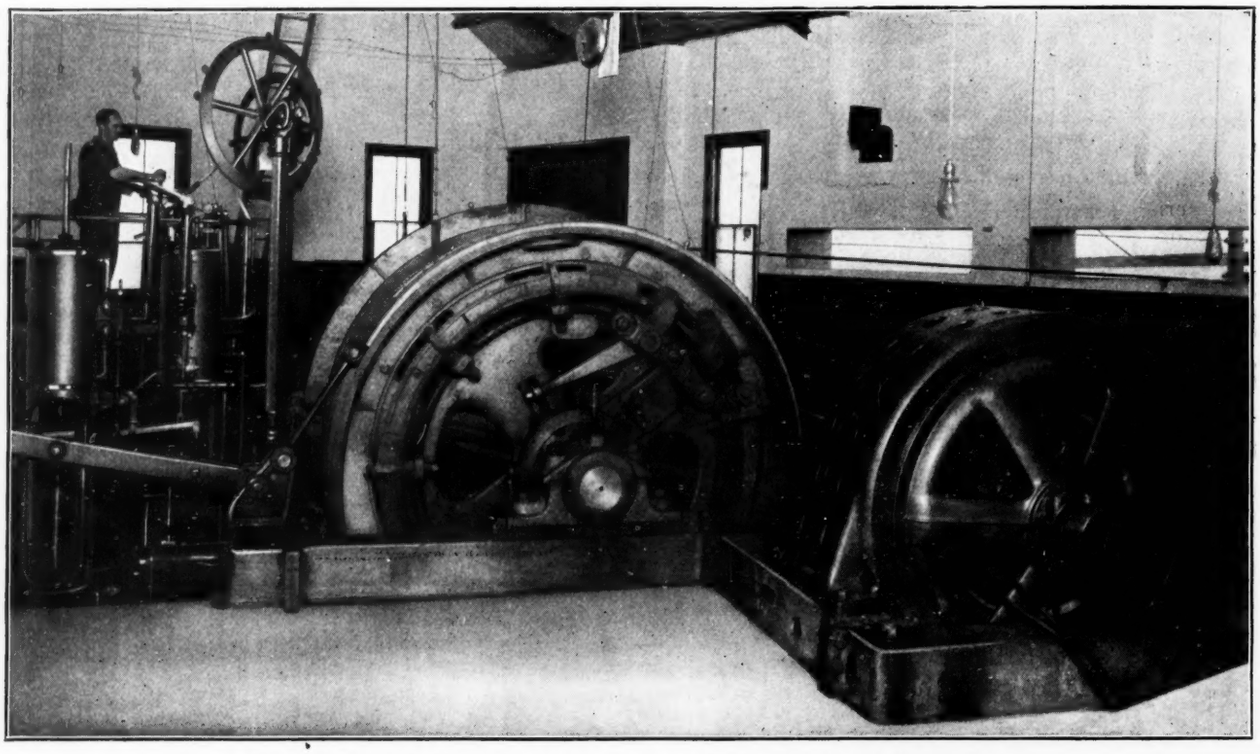


FIG. 2. A 500-HP. 440-VOLT MOTOR-DRIVEN DOUBLE-DRUM MINE HOIST

The value of 200 lb. per ton normal pressure for rope friction will be used as in the first case.

Weight of rope on 30 per cent. grade = 400 × 3 = 1,200 lb. = 0.6 tons; 0.6 × 0.954 = 0.5724 tons normal and at 200 lb. per ton = 114.48 lb. due to friction.

Weight of rope on 40 per cent. grade = 600 × 3 = 1,800 lb. = 0.9 tons; 0.9 × 0.916 = 0.8244 tons normal pressure, which at 200 lb. per ton = 164.88 lb. friction.

MOMENT DUE TO ROPE FRICTION OF UP LOAD

At 0 turns..... (114.5 + 164.9) × 4 = 1,120
15.9 turns..... 164.9 × 4 = 658
39.7 turns..... 0

Down rope similarly:

At 0 turns..... = 0
23.8 turns..... 164.9 × 4 = 658
39.7 turns..... 114.5 + 164.9 × 4 = 1,120

SUMMATION OF ROPE AND ROLLING FRICTIONS

Turns	0	15.9	15.9	23.8	23.8	39.7
Up skip	2,005	2,005	1,930	1,930	1,930	1,930
Down skip	769	769	769	769	800	800
Up rope	1,120	658	658	430	430	0
Down rope	0	430	430	658	658	1,120
	3,894	3,862	3,787	3,787	3,818	3,850

In a case like this, where so many small values are involved, it is well to plot them to a large scale and use only the total result in the final moment curve (see Fig. 5). From this curve the total rolling and rope frictions can be transferred to the total moment, as shown in Fig. 6.

Having all values calculated and plotted except "hoist efficiency" and acceleration and retardation moments, the next step is to find the algebraic sum of the moments thus far, as the mechanical efficiency moment will be taken as a percentage of the net sum of the values plotted.

SUMMATION OF MOMENTS

Turns	0	15.9	15.9	23.8	23.8	39.7
		Up				
Up load	36,000	36,000	48,000	48,000	48,000	48,000
Rope	4,320	2,880	2,880	1,900	1,900	0
Roll and rope friction	3,894	3,862	3,787	3,787	3,818	3,850
Total up	44,214	42,742	54,667	53,687	53,718	51,850
Total down	19,200	21,100	21,100	22,080	17,280	18,720
Net	25,014	21,642	33,567	31,607	36,438	33,130
Mech. Fr	7,500	7,500	7,500	7,500	7,500	7,500
Gross	32,514	29,142	41,067	39,107	43,938	40,630
		Down				
	0	15.9	15.9	23.8	23.8	39.7
Skip	19,200	19,200	19,200	19,200	14,400	14,400
Rope	0	1,900	1,900	2,880	2,880	4,320
Total	19,200	21,100	21,100	22,080	17,280	18,720

In a hoist of this kind it is probably as satisfactory to determine the average moment and from this average determine the mechanical friction moment and add this as a straight line to the net moments—thus:

$$\frac{(25{,}014 + 21{,}642)}{2} \times 15.9 = 370{,}500$$

$$\frac{(35{,}670 + 31{,}607)}{2} \times 7.9 = 266{,}000$$

$$\frac{(36{,}438 + 33{,}130)}{2} \times 15.9 = 551{,}000$$

$$1{,}187{,}500$$

$$\frac{1{,}187{,}500}{39.7} = 29{,}900 = \textit{average moment}$$

A hoist efficiency of 80 per cent. may be safely assumed; therefore the friction moment will be $\frac{29{,}900}{0.80} - 29{,}900 = 7{,}500$.

ACCELERATION AND RETARDATION

Total weight to be accelerated:	
Coal	18,000
2 Skips	24,000
Rope 3,000 + 3,000 + 1,000	7,000
Weight of rotating parts at rope center	50,000
(Say 100,000 lb., at rope center)	99,000

Drum r.p.s. $= 0.794$

Turns during acceleration $= \frac{0.794 \times 12}{2} = 4.764.$

V of entire mass $= 20$ ft. per sec.

$a = \frac{20}{12} = 1.66$

Force $= \frac{1.66 \times 100{,}000}{32.2} = 5{,}160$

$M = 5{,}160 \times 4 = 20{,}640$

RETARDATION

Since all values remain the same except the time which enters as the first power, the retardation moment may be found by multiplying the acceleration moment by the inverse ratio of the times.

$$\frac{20{,}640 \times 12}{8} = -30{,}900$$

Turns during retardation $\frac{8 \times 0.794}{2} = 3.18$

$39.7 - 3.18 = 36.52$ turn or the point at which retardation begins. It is now only necessary to add the acceleration and retardation to the total already plotted—thus:

Turns	0	4.76	4.76	15.9	15.9	23.8	23.8	36.5	36.5	39.7
Total Less Acc. and retd. acc.	32,514	31,450	31,450	29,142	41,067	39,107	43,938	41,300	41,300	40,630
Acc.	20,640	20,640	0	0	0	0	0	0	0	0
Retd	0	0	0	0	0	0	0	0	−30,900	−30,900
Total	53,154	52,090	31,450	29,142	41,067	39,107	43,938	41,300	10,400	9,730

From the foregoing values the horsepower can be calculated by the formula:

$$\textit{Horsepower} = \frac{2 \times \textit{r.p.s. of drum} \times \textit{moment}}{550}$$

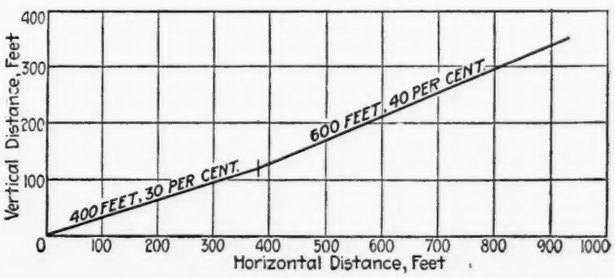


FIG. 3. PROFILE OF THE SLOPE

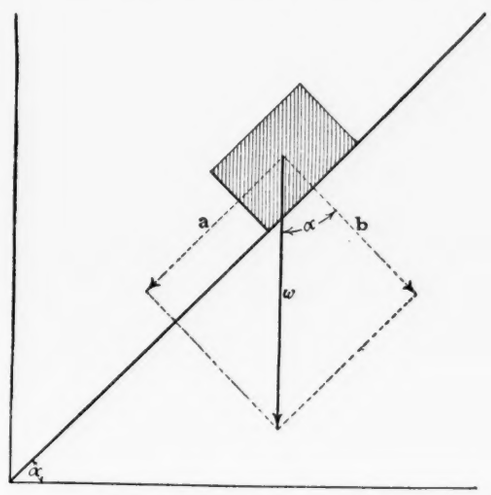


FIG. 4. FORCES ACTING ON THE TRIP AND THEIR RESOLUTION INTO COMPONENTS

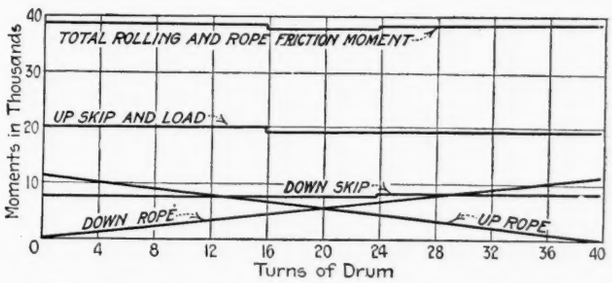


FIG. 5. PLOTTED AND COMBINED MOMENTS ACTING ON THE HOIST DRUM

The time of acceleration and retardation is known and the other points on the cycle are found by dividing the turns between any two points by the r.p.s.

FINAL SUMMATION

Turns	Moment	Horsepower	Time	Total Time
0	53,154	0*	0	0
4.76	52,090	477*	12	12
4.76	31,450	285	12	12
15.9	29,142	264	14	26
15.9	41,067	372	14	26
23.8	39,107	354	10	36
23.8	43,938	398	10	36
36.5	41,300	374	16	52
36.5	10,400	91.2	16	52
39.7	9,730	....	8	60

* The moment used for these two values is the average from the diagram of the beginning and end of acceleration and the beginning and end of retardation.

The photographs of installations shown herewith are all pictures of General Electric Co. apparatus and have all been in operation a considerable time and are giving entire satisfaction.

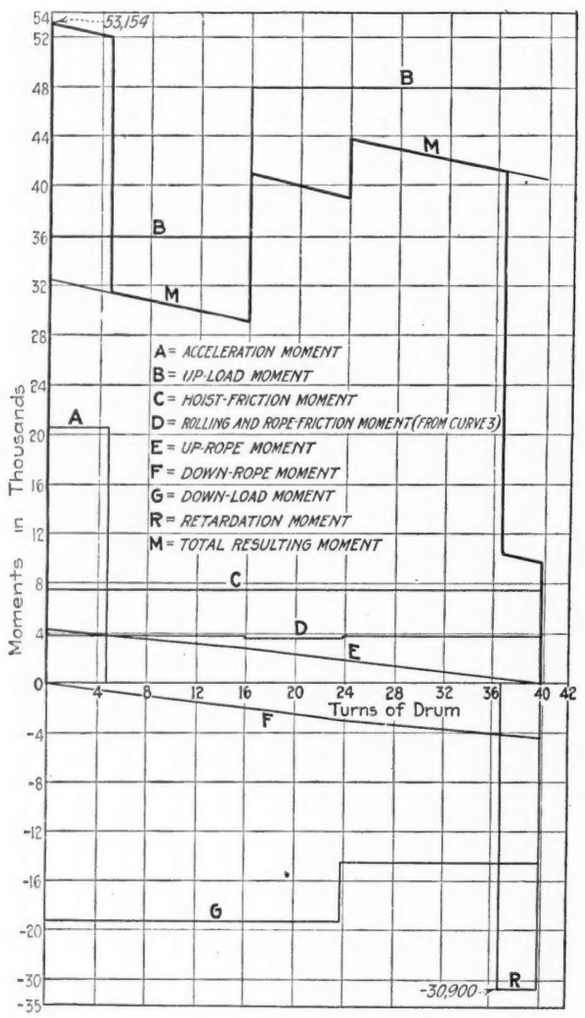


FIG. 6. MOMENT DIAGRAM

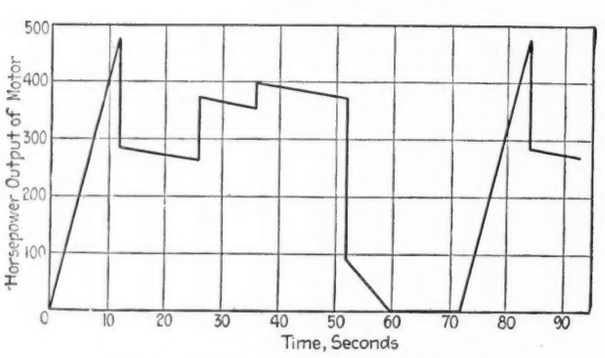


FIG. 7. DUTY CYCLE OF THE HOIST

I have been frequently asked if electric hoisting is not more or less of an experiment at the present time. As answer to this general question I would say that the fact that the above-named company alone has installed 131 mine hoists using either direct or alternating current of 200 hp. or more, 33 of which have been sold since the first of the current year, speaks for itself.

A New Type of Rock Drill

At the February meeting of the Mining Institute of Scotland, Samuel Mavor said that hitherto the compressed-air rock drill, despite its low power efficiency, yielded in practice the highest commercial returns. It therefore has held the field against all competitors, including drills built on the internal-combustion principle. He now believed, however, that the days of the compressed-air rock drill were numbered. He had recently seen in operation a rock drill constructed in accordance with a novel system of power transmission, which absorbed only one-fifth of the power required by a compressed-air drill and could be used in connection with any electric plant.

This system had features that differentiated it from all other attempts to compete with the compressed-air drill, and he believed it was destined to revolutionize not only rock drilling in coal and metalliferous mining, but in all branches of civil engineering and quarrying that were based upon rock drilling.

Mr. Mavor was not permitted then to refer more particularly to the new system, but in the near future developments in this direction would be unfolded. As Mr. Mavor is an expert, this pronouncement will sustain interest in the new drill.

West Virginia Coal Mining Institute Meeting

The seventeenth semiannual meeting of the West Virginia Coal Mining Institute will be held at Bluefield, W. Va., June 1 and 2, in the assembly room of the New Altamont Hotel.

On Thursday, June 1, at 9:30 a.m., addresses of welcome will be made by Fred W. Udy, president of the Bluefield Chamber of Commerce, and Col. W. H. Thomas, vice-president of the Pocahontas Operators' Association. J. C. McKinley will read a paper entitled "The Coal Industry and National Preparedness," and Ernest L. Bailey, of Crumpler, W. Va., will read one on "Cost Analysis Engineering Applied to Mining Operation. The afternoon session will start at 2 o'clock, and the following papers will be read: "The Use of Doors in Mine Ventilation," by Charles L. Bowman, of Canton, Ohio; "Essential Construction Features of Mine Buildings," by R. H. Hamill, of Huntington, W. Va.; "Cement Roofing for Mine Buildings," by H. W. Meyer, of Wheeling, W. Va.; "The Asbestos Shingle," by J. W. Latimer, of Pittsburgh, Penn. At the evening session at 8 o'clock, R. D. Patterson of Lowe, W. Va., will read a paper entitled "The Miner's Garden"; J. B. Crane, of Bluefield, W. Va. and G. M. Wolfe, of Davy, W. Va., will read papers on "Central Station Service for Coal Mines," the former from the producer's standpoint and the latter from the consumer's standpoint.

On Friday, at 9:30 a.m., papers will be read by the following: P. A. Grady, of Bluefield, W. Va., on "Some of the Duties of a Company Mine Inspector"; E. Drennen, Big Stone Gap, Va., "Tendencies"; and Charles W. Connor, Marytown, W. Va., "The Mine Labor Situation." A business session will follow the reading of these papers.

The Bluefield Chamber of Commerce, Pocahontas Operators' Association and the Norfolk & Western Railroad Co. have provided a special train for a visit to the Bluestone power house and an inspection of the electrification of the Norfolk & Western Ry. A buffet luncheon wil be served to the members of the West Virginia Coal Mining Institute en route to the installation at Bluestone.

Uniform Mine Legislation--III

SYNOPSIS—Continuation of the discussion of uniformity in state mining laws by the Mine Inspectors' Institute, U. S. A., and adoption of resolution favoring certification of mine officials.

Upon the meeting being called to order by the president, Mr. Broman, chairman of the committee on resolutions, read the following resolution presented by Mr. Beard and approved by the committee:

Resolved, That it is the sense of the Mine Inspectors' Institute that, in order to secure the greatest degree of safety in the operation of coal mines, it is absolutely essential that candidates for the position of mine foreman, assistant mine foreman and fireboss, in coal mines, should be required to qualify in respect to their fitness and capability to fulfill the duties of such position.

THE PRESIDENT—The purpose of this resolution is to permit the Institute to go on record as to whether or not they favor the certification of mine foremen, assistant mine foremen and firebosses. The subject is now open for discussion.

MR. FLYNN (*Alabama*)—In order to bring the question before the Institute, I move that this resolution be adopted as read. [Motion seconded.]

MR. MOORE (*Pennsylvania*)—For the information of the members present, I want to state that at the present time there is a little friction in Pennsylvania, relating to the qualification of candidates for these positions, owing to the changes that were necessary in the mine law following the recent passage of the compensation act in our state. The mining law was revised so as to give the operator the right to hire a mine foreman regardless of whether he held a certificate of competency. I simply state this as a matter of information.

MR. BEARD (*New York*)—The question before us, as an Institute, requires us to decide whether or not, in our judgment, a mine foreman, assistant mine foreman, or fireboss, should be certified as to his qualifications before he becomes eligible to fill the position desired. We are not to consider whether or not Pennsylvania had any right to take the action she did. Let us consider the question simply as whether or not, in our judgment, men should qualify and be certified for these positions.

QUESTION OF STATE LIABILITY

MR. BEDDOW (*New Mexico*)—This question is a delicate one. While I think it is desirable that all mine foremen should pass an examination and be certified for that position, in the different states, I think we must consider the effect of such certification in its relation to the compensation laws that are being passed in many states. Does the certification of mine officials by the state release the company from liability for accident to their employees?

MR. STARKS (*Illinois*)—It appears that there is a great conflict in the decision rendered by different courts in different states. The Illinois mine law requires both the mine manager (foreman) and mine examiner (fireboss) to hold certificates of competency, issued by the State Examining Board. In a session of court at Cairo, Ill., Judge Wright, of the District Court of the United States, concluded that, because a man is certified by the state, it does not throw the responsibility for his act on the state; but that when employed by a company the man acts as the agent of that company and the company is responsible for his act.

MR. PAUL (*Pennsylvania*)—In West Virginia a court held recently that the coal company was not operating under the mine law, but that the mine was really operated by the mine foreman as agent for the company.

MR. BEDDOW—May I ask Mr. Moore if the law to which he has referred was made for the purpose of bringing the miners under the compensation law or to relieve the mine foreman and fireboss from the need of obtaining a certificate of competency.

EFFECT OF THE MINERS' COMPENSATION LAW

MR. MOORE—If I understand correctly, the law was revised for the purpose of bringing miners under the compensation law recently enacted. Under the old law of 1891 the mine foreman could not delegate certain powers or duties imposed on him by the law to anyone. The coal companies, therefore, operating mines in Pennsylvania took the stand that, inasmuch as the state gave them certified men from whom they were obliged to choose their mine officials, they could not be held responsible for the acts of these men, who ceased to be agents of the companies who employed them. I state this for information so that we may act intelligently on this question.

MR. PAUL—I understand that the new law permits the operator to employ a certified man or his equivalent. I would like to ask, Will the examining boards of the state still continue in force and conduct examinations so as to maintain a standard of competency among mine officials, or will these examining boards be discontinued?

MR. MOORE—That remains to be seen. I have asked the same question myself of gentlemen who were not able to give me an answer on that point.

MR. WRIGHT (*Indiana*)—I would like to ask whether the decisions in West Virginia and Pennsylvania, to which reference has been made, were the decisions of the State Supreme Court or the United States Court, as there is often considerable difference of opinion between different courts.

MR. MOORE—In Pennsylvania it was the decision of the State Supreme Court.

MR. FLYNN—I do not see that this discussion has much to do with the resolution. It is not what different states do, but what this Institute believes ought to be done. There can be little doubt but that the Pennsylvania laws can be amended in such a way as to require the certification of these mine officials by state examining boards as before. In Alabama we are wrestling with the same question of compensation, and I presume 25 different forms have been presented to the legislature from which it is hoped a good law will be developed. In my opinion, the resolution offered is to put this Institute on record as favoring or not favoring the certification of the mine officials named in the resolution. In other words, we are to say whether or not we believe that these mine officials should be examined as to their fitness and competency to fill those positions so that the mine workers will be better safeguarded. It is up to the different states,

which desire to follow our recommendations to enact such laws as will make that possible.

MR. BEARD—I would like to draw attention to the fact that may be overlooked by some, that the resolution as it reads does not say how the candidate must qualify, whether under a state law, before a state examining board, or before an examining board appointed by the company who employ them. The resolution merely states that, In order to secure the greatest degree of safety in the operation of coal mines, it is absolutely essential that candidates for the position of mine foreman, assistant mine foreman and fireboss, in coal mines, shall be required to qualify in respect to their fitness and capability to fill the duties of such position.

RESPONSIBILITY DEMANDS RIGHT OF CHOICE

The question of responsibility, which has been discussed, is, of course, an important one. Those who assume the responsibility for an accident must reasonably be granted the right to choose their men whom they are to place in charge of the mine; but this does not necessarily include their right to set a standard of qualification. The question that certification of mine officials by the state, through their examining board, makes the state responsible for the acts of the person so certified was thrashed out in Iowa in '87 and '88. If I remember rightly, the decision was reached that the act of the state in certifying to the competency of mine officials was a gratuitous act performed by the state for the benefit of the coal operators, giving them the choice of men whom the state considered competent men. It was held that the certification by the state did not go further than an act of courtesy and did not obligate the state to any responsibility for accidents that might occur by reason of the failure or negligence of such certified persons. In the judgment of the State Examining Board, the man was capable, but, working as an agent of the company, who employed him, and the company was responsible for his acts, having accepted him and placed him in charge of its mine. I do not think that the resolution should stand in anybody's mind as being opposed to conditions in any one state, as Mr. Flynn also has remarked. It is only a question as to whether we, as a body, consider that a candidate for any one of the positions named should be qualified as to his fitness and capability.

THE PRESIDENT—If I may be permitted to add a word, gentlemen, it appears to me that it is perfectly proper that we, as a body, say whether or not we favor the qualification of a candidate for an official position in a mine, or favor the appointment to such positions, of men who have shown no qualification as to their fitness and competency. I believe that we, as men, are capable of deciding in our own minds this question, and if we can agree we can go on record as an Institute, either as favoring or not favoring the qualification of candidates for these positions.

SHOULD A MINE SUPERINTENDENT BE REQUIRED TO QUALIFY BY EXAMINATION?

MR. KANARY (*Michigan*)—There seems to be a different name given to the same official in different states. The mine foreman, in Illinois, is called mine manager, and in my State of Michigan he is called mine boss. But in my opinion, if the mine foreman must be certified, the next man above him should also be certified. As I look at it, what good is accomplished by certifying a man who must be governed by the orders of a superior officer who is not certified? Now, if we are going on record as favoring such certification of mine officials, let us include the superintendent and the manager.

MR. BEARD—Personally I agree with Mr. Kanary in his suggestion that the resolution should cover all mine officials who are in direct charge of the operations under ground. This would reach the mine superintendent and require his certification, although I do not think it necessary to require the same of a mine manager, who has charge of financial and commercial matters, rather than the operations in the mine.

MR. RODERICK (*Pennsylvania*)—Mr. Kanary has raised an interesting question. In the hard-coal regions of Pennsylvania the mine officials are about as follows: General manager, manager, superintendent, district superintendent, mine foreman, assistant mine foreman, fireboss and private inspector. In our state no official above the mine foreman is required to be certified. As I have said before, for these reasons it is going to be a difficult matter for us to advocate a uniform basis in regard to these matters. I may say that the inspectors of Pennsylvania do not favor giving up the examination for certificates of competency. They did all they could to prevent letting down the bars, as it has been styled.

METHOD OF QUALIFICATION REQUIRED

MR. WILSON (*Pennsylvania*)—I understood Mr. Beard to say that the resolution does not require qualification before a state examining board, but the candidate may pass an examination prescribed by the company. This would seem to me to place the matter largely in the hands of the operators, as far as qualification is concerned. If I remember correctly, the new Pennsylvania law requires the candidate to pass a state examination, or, in the judgment of the operators, to be equally competent with a person who has passed such an examination. Now, in my opinion, this is quite different from permitting the operators to select anybody, as suggested by Mr. Roderick's remarks. In my judgment the coal operator, as has been stated, should be permitted to select the man who is to have charge of his mine, but that such a one should be required to pass some kind of an examination. If the Institute should go on record as favoring such qualifications, I think the recommendation would not seriously affect conditions existing in different states.

MR. BEARD—This discussion has developed some interesting and valuable points that cannot but prove a great benefit to all of us. I would suggest, Mr. President, that, with the consent of the seconder of this motion, the resolution be made to read as follows:

Resolved, That it is the sense of the Mine Inspectors' Institute that, in order to secure the greatest degree of safety in the operation of coal mines, it is absolutely essential that candidates for all positions of authority in respect to underground operations should be required to qualify for such positions by passing an examination that will show their fitness and competency to conduct the operations in a mine in a safe manner.

I think this form that I have just read will meet many of the objections that have been made and will specify more clearly the qualifications desired.

Calls for the question resulted in a unanimous vote for the adoption of the resolution as finally read.

Stocking Anthracite Coal

By E. B. Wilson*

Stocking coal is always an interesting subject to coal operators and large consumers. In the past the anthracite operators have stocked coal in veritable mountains in order to keep the mines running when the demand was short or when the small sizes accumulated during the summer months faster than they could be sold.

Bituminous-coal producers and consumers cannot stock coal in as large quantities as anthracite on account of the danger of spontaneous combustion. Frequently, to avoid this and prevent deterioration or air slacking, the coal is submerged in water.

To unload the coal from the railroad cars and stock it costs more than to reload it from the stockpile, the difference ranging between 3c. and 5c. per ton. Possibly a fair average cost would be 9c. for reloading and 12c. for unloading and stocking.

One of the various systems adopted by the Delaware, Lackawanna & Western Coal Co. for reloading as well as for stocking, for all sizes of coal, combines the use of machinery and water, and incidentally employs the transportation of coal by water through pipes. This latter method of transportation is agitated every few years by some person who, seeing an oil pipe line, believes that he has discovered a new way of bringing the railroads, or rather the railroad officials, to their knees.

Water transportation by boat is cheaper than by rail where the distance between the mines and the consumer is long. However, the transportation of coal by water through pipe lines is more expensive than either of the methods mentioned. Furthermore, only small sizes can be made to flow through pipes and pumps, while pumping must be continued as long as any coal remains in the pipe line.

One plant constructed for stocking and reclaiming buckwheat coal consists of two towers, one on either side of the stockpile, the two being connected by a wire-rope suspension bridge on which sectional sheet-iron troughs are placed. The remainder of the plant comprises elevators, pumps and scraper lines.

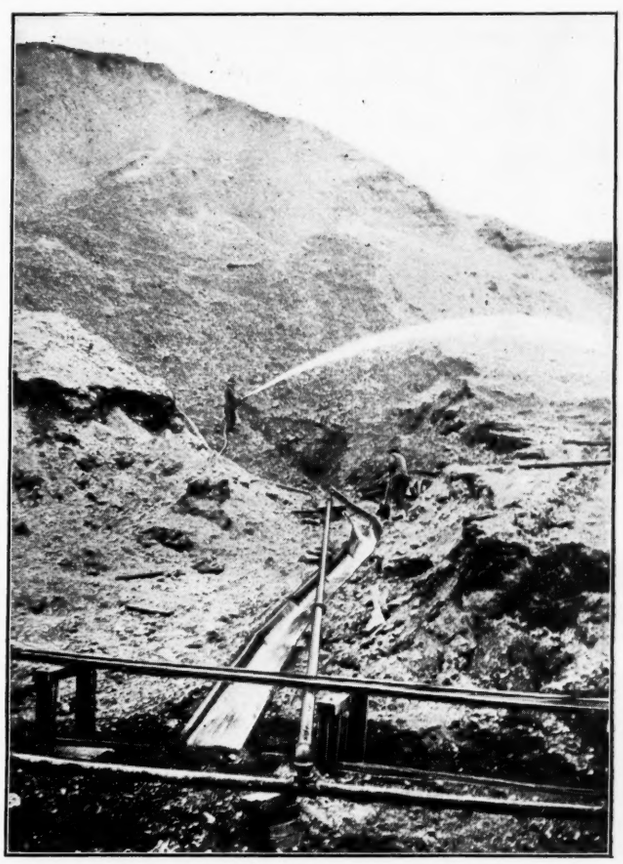
When coal is to be stocked, it is brought to the tower from the various breakers in hopper-bottomed cars and discharged into a pit beneath the tracks. From this an elevator carries it to the top of the tower and dumps it into a hopper leading to the sheet-iron trough extending along the suspension bridge. Water moves the coal from the hopper to the place where it is to be stocked. As the coal accumulates at the end of the trough, a section is removed. The coal pile is thus built up "retreating."

Coal of buckwheat size when mixed with water is quite mobile and spreads over a considerable area, thus making a large pile before it becomes necessary to shift the position of the bridge. To reclaim the coal, portable scraper lines skirt the pile and carry the material to the boot at the bottom of the tower, from which it is raised by the elevator to a loading bin.

One method adopted for transferring the coal from the pile to the scraper lines is shown in the accompanying illustration. A stream of water washes the coal into a trough, which is given a grade sufficient to allow the mixture to flow to the scraper line. A grade of 1 in 12 is amply sufficient for this purpose where sheet iron is used and three times as much water as coal is flowing. Usually the water used for this purpose is impounded in a settling reservoir and reused. The coal pile shown in the picture once contained 376,000 tons. When the photograph was taken, however, consumers, evidently fearing a famine, had created an artificial demand and were rapidly taking the entire pile.

In order to remove the coal from the part of the pile a considerable distance from the loading tower, a 12-in. diameter pipe line was installed and given a slight downgrade. The coal was flushed into this and forced to the tower by hydraulic pressure.

Coal stocking, while expensive, permits the operators to keep the mines running and was formerly practiced to a much greater extent than at the present time. Even the recent conference between the miners and operators did not induce the latter to make use of their storage plants to the extent which such meetings have done in times past. Surplus coal was once stored in large quantities in New Jersey near the docks, until the state authorities began to tax the coal piles, which made the system unprofitable for the operators.

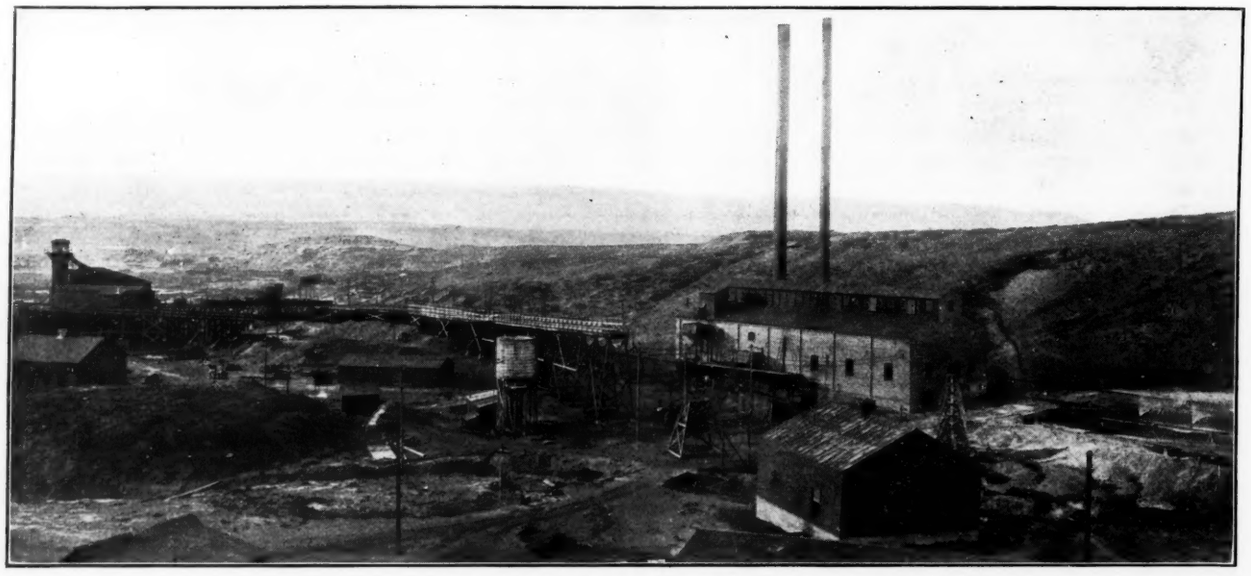


HYDRAULICKING COAL TO THE SCRAPER LINE

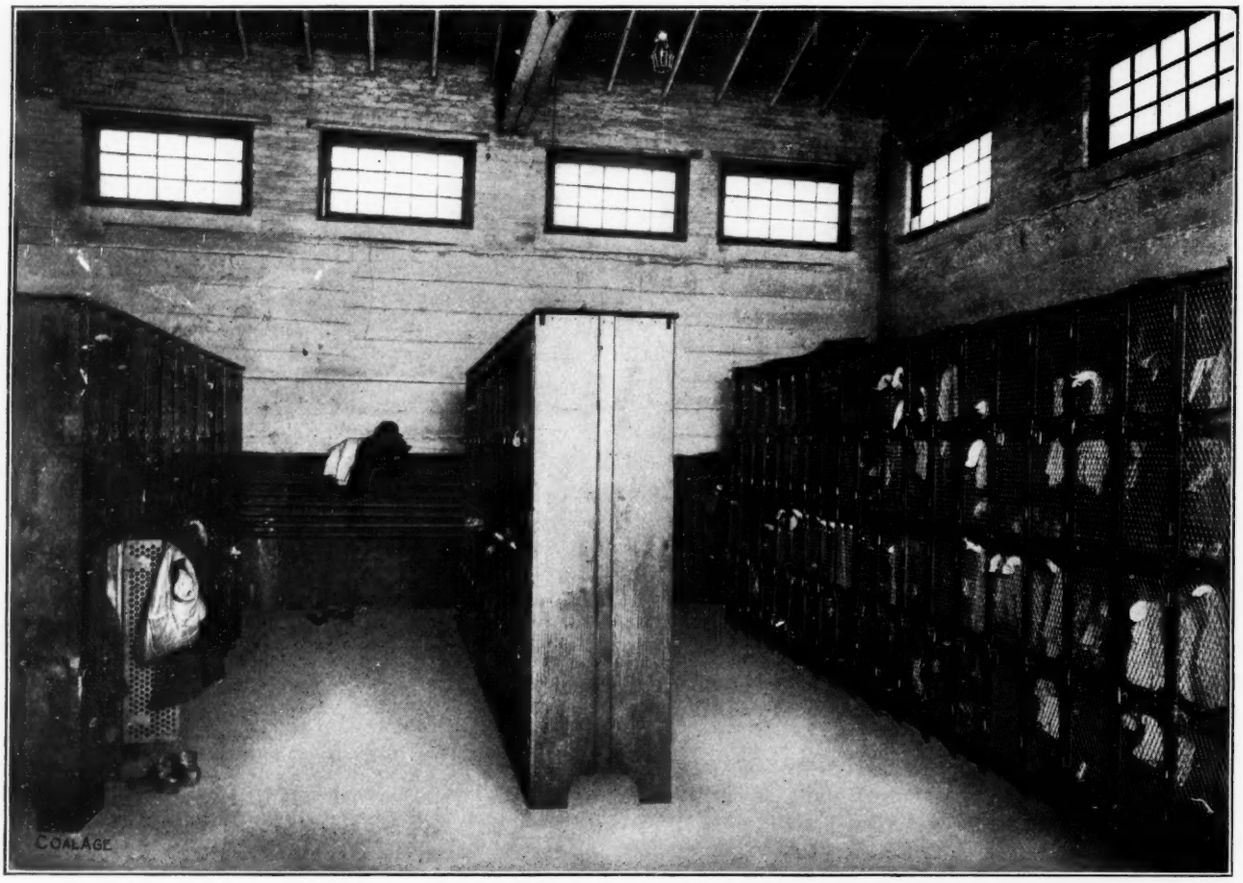
*Scranton, Penn.

The British War Department is asking for a large number of miners to undertake tunneling work at the front. A number of miners who had enlisted have been taken from their regiments and placed on tunneling work, and the department desires to get more men direct from the mines for this labor, so that the soldier-miner can be released and allowed to return to his regiment. In the present siege warfare the miners are important members along every mile of front, as without them advances would be terribly costly.

Snapshots in Coal Mining



NEW POWER HOUSE, TIPPLE AND RESCREENING PLANT OF CENTRAL COAL AND COKE CO., ROCK SPRINGS, WYO. MINE HAS A CAPACITY OF 1,600 TONS PER DAY



LOCKER ROOM IN WASHHOUSE AT THE STORRS COLLIERY OF THE DELAWARE, LACKAWANNA & WESTERN RAILROAD CO., NEAR SCRANTON, PENN.

Purifying Water at a Coal Plant

The United States Coal and Oil Co., of Holden, W. Va., recently installed a water softening, purifying and filtering apparatus to supply pure water for the power plant and for domestic use. This improvement is in line with the company's progressive policy and welfare work in operating economies. This firm, like many others in the coal field, was confronted with the problem of securing a water supply upon which it could depend regardless of weather conditions.

The main source of supply is from wells and a small creek, which in dry weather is supplemented by drainage from the mines. During a portion of the year, all three sources are required to furnish the necessary water for the power plant and village. The use of these waters resulted in scale and corrosion in the boilers, with a consequent loss in efficiency and a heavy maintenance expense for fuel, repairs, cleaning, etc.

None of the supplies in their natural state are suitable for domestic use on account of the iron, suspended matter and other impurities present. Since it was necessary to treat a mixture of varying quantities from three supplies, it was advantageous to select a water-softening and purifying system that would insure uniformly soft, clear water, of high bacterial purity, regardless of the composition of the mixture of water to be purified.

The We-Fu-Go intermittent system built by William B. Scaife & Sons Co., Pittsburgh, Penn., was finally selected. In this apparatus a definite measure of water can be accurately treated and the purification verified before water is drawn from it.

The apparatus installed consists of three large reaction and settling tanks, equipped with power-operated stirring devices; a reagent-mixing tank, with mechanism for introducing reagents into the reaction and settling tanks; and a mechanical gravity filter, with a crushed-quartz bed for the final clarification of the water.

The operation of this system is as follows: While a reaction and settling tank is being filled with water, the reagents are introduced and thoroughly mixed by means of the stirring device. Tests are then made to verify the correctness of the treatment. When the tank is filled, the stirring device is stopped and the water allowed to settle for three hours. It is then drawn off through a floating outlet pipe to the filter and thence delivered to the clear-water receiving basin. There are three reaction and settling tanks, so that while one tank is being filled and treated, the water is settling in the second, and the third tank is supplying softened water to the filter.

Raw water from the creek dam is delivered to the apparatus by means of a motor-driven centrifugal pump. The softened, purified and filtered water is delivered into a receiving basin, from which it is pumped into a reservoir located at an elevation of about 300 ft. above the water softening system.

Since the water softening and purifying system has been installed, the renewal of boiler tubes has stopped, cleanings have been unnecessary and a fuel saving of 15% has been made; so that the return from the investment from this source alone more than justifies the expenditure. Before the system was installed, all lavatories and bathtubs were coated with a characteristic red stain, which could not be scrubbed off, and most of the laundry work was sent away.

Now there is a clear, soft water for all uses, the laundry work that formerly was sent out of town is done at home, and the lavatories and bathtubs are free from unsightly stains. The water is perfectly adapted for all domestic uses. Six months' operation of the water purifying system shows a money saving indicating a full return of the outlay within 18 months.

Coke Concrete Found Strong After Seven Years

By Kenneth A. Heron*

About seven years ago the writer was called upon to underpin the front wall of a battery of coke ovens at Segundo, Colo. It had been the custom to "pull" the ovens by hand previous to that time, and certain changes were necessary to be made in the wharf level to provide for the installation of coke-pulling machines. In order to lower the wharf level 2 to 3 ft. as planned, it was required to extend the face-wall lower with a suitable foundation, as the original construction did not contemplate the removal of the material in front of the wall so as to expose its toe. The underpinning was to extend at least 2 ft. below the new wharf level and, being thicker than the old wall, was to be carried up the face a short distance.

Suitable sand or gravel could be obtained only by shipping it from outside points at considerable expense. There was available, however, at the plant large quantities of coke breeze—waste coke too small for furnace purposes—ranging in size from dust to about 1 in. Coming directly from the ovens, it was clean and free from vegetable matter; and it was accordingly adopted for use as concrete aggregate, in the proportion of six parts coke to one part cement, for the new footing.

The mixture when wet formed a mass of brownish color weighing about 80 lb. per cu.ft. It was very easily mixed, handled and placed in the forms and when hardened and brushed with cement grout resembled ordinary sand and rock concrete, although not obtaining as hard a set. A week or ten days after placing, however, it would resist quite a sharp blow without fracture and carried the load of the heavy wall without any appreciable settlement.

An examination recently showed that the mass had hardened to a degree approaching the strength of the coke, and, while chipped and broken off in places exposed to heavy wear, was serving its purpose very well.

Since this work was done, coke concrete has been used for a number of other purposes in some of the other southern Colorado coal and coke plants. At Tabasco one of the fuel companies has erected a large number of coke-concrete blockhouses, and I am informed that they are much drier and more satisfactory than are stone-concrete block structures. The cost of making the blocks was about two-thirds the estimated cost of stone-concrete blocks.—*Engineering News,* May 4, 1916.

Impurities in the Southern Anthracite Seams—In the southern anthracite region it is necessary to take out from 40 to 50 per cent. of refuse along with the run-of-mine coal. This refuse has to be separated from the coal on the surface and stored on a very limited surface area in that region. In the northern field the basins are more shallow and the veins flatter, but as the coal is spread over a very wide area, the cost of transportation is high.

*Chief Engineer, Goose Lake Valley Irrigation Co., Lakeview, Ore.

Don'ts for Machine Men and Helpers

By Ostel Bullock*

Don't leave your machine running while you take a drink of water or eat your lunch. It is better to lose a few minutes than a helper.

Don't hang your electric cable on the wire in the morning without first going to the machine; there may be a fall on the machine, or something else may have cut your cable, making it dangerous.

Don't hang the positive wire of the cable on the negative conductor of the line, as it is dangerous and may kill your buddy.

Don't leave your cable across any track; always put it alongside the track which your machine is on. A driver or motor may enter a track across which a cable extends, and this would put you to some trouble repairing your cable, even if no one was hurt.

Don't pass through a door or curtain without first knowing there is no driver or motor on the other side that you might run into.

Don't try to mend a chain or do any repair work on the machine while the cable is on the wire, since through accident the machine might be started. This would be extremely dangerous for you.

Don't leave your cutter bar in the kerf over night; it may be too tight to come out in the morning, and you will have to dig it out with a pick. It is much easier to run it out at night with a wrench.

Don't leave your machine in a place where water is liable to rise during the time you are out of the mine; it might ruin the fields and armature.

Don't remove the governor wire from your machine; it will ruin the machine and is dangerous, as the machine will cut too fast.

To Make Co-operation in Exporting Lawful

For more than two years coöperation to increase export trade has been a slogan of American business men. The agitation for the passage of an act permitting combined effort in export fields has now taken shape in a bill which is before the Senate at Washington. For nearly a year the Federal Trade Commission has been investigating competitive conditions affecting Americans in international trade. It has found that one important reason for the success of European manufacturers in foreign markets is their superior organization. American manufacturers find that foreign makers often undersell them here because of syndicate agreements such as Germany has, under which prices are maintained at home while special low prices are made on exports. It is also found that foreign buyers of some American products are able to buy these products to better advantage at times than consumers here. Combined action of foreign buyers and independent action of American producers have enabled the former to hold aloof in a dull market until some anxious American seller cut the price.

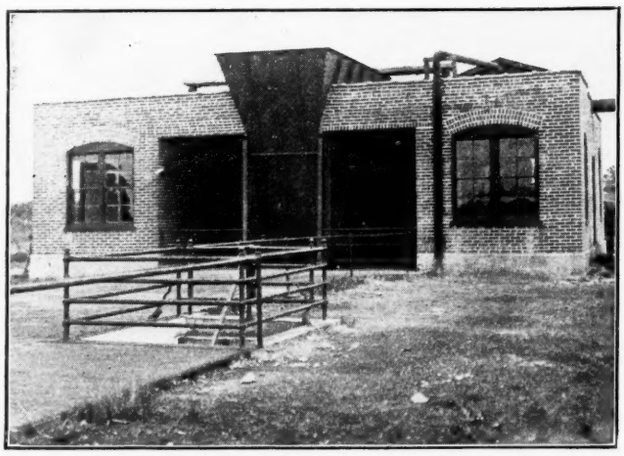
The upshot of the commission's report just sent to the Senate is a unanimous recommendation that the Sherman act be so amended as to permit business men to use the same weapons which foreign manufacturers have so long employed and so successfully. What the best minds in Europe have approved, American manufacturers can now attempt only under peril of being put on trial as lawbreakers. The commission is fully convinced that it is not fair to subject American manufacturers to the competition of European syndicates and then deny them the right of self-defense.

Foreign-trade extension is no partisan matter. The fruits of an increase in our overseas commerce will be reaped not only by manufacturers, but by the transportation, mining, jobbing and retail-merchant interests of the whole country. Home trade can only be affected favorably by the proposed permission to combine on exports. The Senate bill is particularly in the interest of smaller concerns, since the largest manufacturers have export organizations of their own. Business men should promptly write their Senators and Representatives, asking them to make the Federal Trade Commission's recommendation a law.

Nenana Field Will Be Opened

Although it will not be possible to make the coal from the Nenana fields in Alaska available to the residents of the interior of the north this summer, everything possible will be done to bring this coal into use by next year. This was the gist of the statement made by Thomas Riggs, Jr., member of the Alaska Engineering Commission in charge of the Fairbanks division of the government railroad, who was in Seattle the first of May on his way to Alaska to take charge of the work.

"The amount of work that will be done in the interior of Alaska this year," said Mr. Riggs, "is dependent upon the size of the appropriation made by Congress and the number of available workmen. The material going to Fairbanks will be needed at that place. While we will send in a large amount of material and equipment, it may not all be utilized this year. We are just feeling our way, so far as construction of this part of the line is concerned." Commissioner Riggs said that before leaving Washington he learned that the regulations under which the coal lands of Alaska will be made available to development will be issued by the interior department the last of May, and it is expected that several companies will start operations in different parts of the many fields.



JEFFREY FAN AT NO. 9 MINE OF MADISON COAL CORPORATION, DEWMAINE, ILL.

*Cleaton, Ky.

Editorials

Discipline for Employees

The title of this editorial has an ugly sound. We like to go through life without discipline. We wish, all of us, that we could go our way without it. But we can't. The rich man may think he can do as he will with his money, but if he does not discipline himself he soon finds his way to the bankruptcy court. Or perhaps he steers his own financial bark easily until it hits the rock of the law and goes suddenly to pieces.

In fact to hear many rich men talk you would think they of all men were the most restricted in their action. It is true they occasionally have a little rope and as a result quite frequently hang themselves, metaphorically speaking. The reason why they do not more often come to grief is that a man will never be rich if he does not submit himself to some kind of discipline.

It is not only the rich man who exercises control over others. The poor man takes a hand sometimes in enforcing discipline. He buys something at the store and it does not arrive in time. He disciplines the storekeeper by dealing somewhere else, and the merchant, poor fellow, has no union to say to the tyrannical customer: "You can't bring that man to time. We'll see to it that you continue trading with him."

But the miner tries to arrange matters so that he will have no discipline. He will work when he will and rest when he will; he will enter the mine at his pleasure and will leave it when he gets ready; he will do his work as he pleases. Everyone can sympathize with the miner in this desire. Why, what he wants to do we all have wanted long and often. His is no new and original sin.

But the processes of production may not be held up by a man of that caliber any more than the progression of pedestrians on a city street may be halted by a crowd of hoodlums in line or a group of would-be politicians in conference. There must be discipline—the more so that we have found it necessary to introduce division of labor into mining.

How would a machine shop route work if a large proportion of the men were idle? If the coremakers were absent on Monday, what good would it be for the founders to report for work the next day? And so on through the whole shop. A small body of men by its idleness can tie up the whole factory.

In the same way in the mines, the idle cutter lays off the loader and the idle loader makes the cutter idle, and the tracklayer who goes on a visit may lay them all off. It is marvelous to note in a modern office how everyone is present every day. If one stays away there is general comment. But in the mines it is not so. The percentage who are idle is always high.

There is little or no discipline, and order is badly needed not for the coal operator alone but for the good of the nation, which always pays more for fuel when the work is done in a dilatory manner. Discipline is necessary for the benefit of the wife at home, for the advantage of the other laborers who cannot work when they would because others will not work when they should. Moreover, discipline and steady work are needed for safety. The man who knows the road, the job and the place is safer than the raw man who has these yet to learn.

Another reason exists for discipline. It is not only the extensive division of labor but the distribution of places. In hand mines every man has his own place, as in England every "locomotive driver" has his own engine. But this condition is changing with the introduction of machines, and men are quite frequently shifted a little. But still there is a limit to such redistribution. The loaders thus shifted have a huge box full of tools—shovels, picks, drills, powder, an ax, spikes, lamps, carbide or wicking, a needle, tamping tools, a wedge, a sledge, a bar and a gage. Such men are not exactly in light marching order and consequently cannot be shifted about at will and without notice.

Thus it is that discipline is needed. We would all like to feel that the world was built so that control is unnecessary. But then it would be a noncoöperative world, and some of the noblest traits of humanity are bound up in order and coöperation.

General Unrest at Mines

The trouble in the anthracite region and in western Pennsylvania appears serious, but will most probably blow over. The miners' representatives in the former region knew just what they were signing when they agreed to accept the contract, though perhaps a referendum of the miners would have had an entirely different result. The unfortunate thing is that the arts by which the mine leaders have time and again misled the public were used in this case to persuade the men that they had received larger concessions than had really been made.

The rank and file apparently did not realize that the 8-hr. day had so many drawbacks as it was soon found to have. It was a concession on both sides and not, as had been represented to the miners, a complete surrender on the part of the operators. But the contract is a bond that the miners cannot afford as an organization to break, and after a few more days it will be accepted with resignation.

The trouble around Pittsburgh, where 50,000 men are idle, arises from the feverish anxiety of the operators to keep their mines working. The men know that the profits are large and want to participate in them. Unfortunately if they were allowed to do so they would insist that they be paid the same scale even after business had fallen off to such an extent that the operators could not afford to pay their men so liberally.

The Pittsburgh region is an exporting area shipping north, south and west, and if it put its scale too high the mines in other regions would in less prosperous times steal all Pittsburgh's business. But this trouble is a minor one. It is not true, as some miners claim in their wrath, that the new scale, with its concessions regarding powder and house rent, is less liberal than the old.

It is the best scale the union has signed anywhere outside of some of those made in the eastern parts of West Virginia, and it is on the whole unfair to the operators of Pittsburgh district. Contracts when first made nearly always create much discontent, even though later they are often mentioned as great triumphs of diplomatic skill.

Inefficiencies in Inspection

The miners in the anthracite region have been stirred up about the inefficiency of inspection in the mines in which they work; and perhaps they are right, for there are many kinds of inspection—four, to be exact—and possibly not all of them are equally efficient.

First there is the state inspection by men in the employ of the state, then there are inspectors appointed and paid by the companies which are compelled by the state to furnish such men. These inspectors are otherwise known as mine foremen and firebosses. There are also special safety inspectors engaged by many of the companies to see that the mine work is done safely. And lastly there is a more numerous body of men known as the contract miners, who are supposed to take care of the lives of their laborers.

A law was passed some years ago forbidding any man to work as a miner in the anthracite mines till he had a certificate, and that law forbade the giving of such a credential to anyone who had not worked in the mines two full years. The purpose—or was it only the alleged purpose?—of that act was to provide that every laboring man should have an inspector at his elbow who would look after his safety—a practical man who would be able to superintend and aid in the timbering of the place, the placing of the shots and their firing, the testing for gas, and who would be able to keep watch and ward for all the dangers of mining in a region where dangers are many and likely to be overlooked.

The contract miner has not been the perfect guardian that the law anticipated. He has not been early and late the helpmate of his laborer. He has been prone not to work the full length of the shift, but rather to leave the laborer to his own devices—that is, during his absence he has let his buddy act as a miner contrary to the law.

He is not to be greatly blamed for his lack of social consciousness. Perhaps this is the first editorial which has ever been written which brought to his attention his duty to his fellow-employee under the law. All that has been said hitherto, especially in this periodical, has been general—the mutual relation between fellow-workmen and not the inspectional relation which exists between contract miner and laborer.

He does not get that continual admonition in print and on platform which warns, let us say, John D. Rockefeller, Jr., or Andrew Carnegie, or even the mine operator of his social and legal obligations. His relation to his helper is not mentioned, while that of the mine inspector to the miner is a matter of daily comment.

As a result the contract miner does not know that he offends grievously—that is the only fit word—when he leaves his laborer part of the day, even half the day, to his own devices. But the technical press should beware. Almost the head and front of James E. Roderick's offending has been that he recommended that the contract miner exercise his important duties just a part of the time. Here we have ventured to recommend that he do his duty all the time, which indeed is monstrous.

The chief inspector urged that the miner take his duties seriously when the roof of the mine is unsafe and when pillars are being drawn. In this he was bold, everyone will admit who knows the contract miner; in this he was weak, everyone will say who understands what the intent of the law was.

Let not the contract miner forget that the people are aroused to the need for safety and will not lightly forgive him if he leaves his work of guardian half performed. He prides himself on being a practical man. Let him give the laborer the full benefit of his long experience.

Because the contract miner has been required at Mr. Roderick's suggestion to keep some of his hours of duty is one reason, perhaps, why he has started a hue and cry after the mine inspectors for staying at home and making up their reports when they should be inspecting the mines and for traveling to the mining towns on the time of the state and not in their own time.

The inspector, it is intimated, though no one is foolish enough to say it, should be traversing the country and making his reports in that span of time when the day hand is visiting the movies and playing baseball. And during the eight hours appointed for day hands he should be plodding through the mines, though the miner will work in them only a part of that time.

The three classes of inspectors who, with the contract miner, guard the safety of anthracite mines keep, on the whole, the hours demanded of them by the state and the company. The contract miner will do so also or he will violate his social and legal obligation and the pledge which the union has made to the companies. He has not been duly admonished, and he would not be human if he did not need a little sermon now and again—just as much as does the fallible being for whom he works.

Utilizing the Minutes

The measure between success and mediocrity generally consists of nothing more nor less than the way we use our odd minutes—especially that part of our time called "spare minutes." No man ever climbed high working only when he had to. We must let work be one of our hobbies. Every business and every line of labor has something of a pleasant side—something that we can do at home that is a little different from our day's routine, but that still relates to the business we follow. If that something will make us more efficient and better informed in the profession we follow, and at the same time furnish us additional income, we are surely unwise if we overlook the opportunity.

Coal Age has certain contributors who write articles only in their spare time and only when they feel inclined to do so, and who receive as much as $500 a year for what they send in. One man who is not a professional writer and who occupies an important coal-mining position, last year received $1,000 for the articles and news matter he submitted for publication in *Coal Age*. Any other reader willing to put forth the effort can do as well. Resolve today that you will do some writing and see what the next twelve months will net you. Descriptions of all kinds of mining plants, methods and machines are of interest. News of every sort, photos, cartoons, personal items, accounts of accidents, etc., are desired. It's up to you!

Department of Human Interest

Treatment in Gas Poisoning

According to L. G. Irvine in the *Medical Journal of South Africa,* September, 1915, the records show that the treatment of cases of gas poisoning is not as expert as it should be. In the past, several would-be rescuers, working with misdirected heroism, have lost their lives, and many more have been overcome temporarily through ignorance or heedlessness of the risks they ran or sometimes because adequate ventilation was not provided. Dr. Irvine gives in substance the following points to be observed when attempting a rescue:

1. When gas is encountered, compressed air, if available, should be turned into the place where the accident occurred, and the air should be kept flowing so long as the rescue continues. This not only supplies purer air to those overcome, but also makes it safer for rescuers to enter the danger zone.

It seems an obvious precaution to take, but neglect of it has not infrequently resulted in disaster to those attempting rescue and in fatal delay in removing those who have already been overcome. No one should enter the danger zone until the air has been allowed to sweep out the area for several minutes.

2. No one must be allowed to enter the danger zone alone. Loss of life has occurred from the violation of this important rule. Four men should constitute a rescue party, so that if one is disabled the others may be able to help him. Men who have already been engaged in rescue work should not enter the danger zone a second time if fresh men are available.

3. Rescuers should carry with them one or two candles to test the air (doubtless oil lamps would serve as well) and also electric lamps or, failing these, acetylene lamps. They should never assume that the air is safe because candles continue to burn, but always regard it as an urgent danger signal if candles burn low or go out. If this happens, rescuers should at once withdraw until the air has been more completely cleared of impurity by the discharge of compressed air, unless rescue can be effected immediately and easily.

4. The affected man should then be brought as quickly as possible to the nearest place where the air is fresh, and the rescuers should immediately endeavor to restore his breathing. If the treatment is delayed till the man can be brought to the surface, it will have but little chance of success; and in cases where artificial respiration is required, the delay will render treatment hopeless. Yet this mistake is often made.

URGES VOMITING TO REMOVE GAS AND MUCUS

The following treatment is recommended in most cases:

1. When the poisoning is slight and the man is still conscious and able to swallow, give him a dose of emetic, copper or zinc sulphate being the excitant usually employed. When that has acted, follow with a dose of sal ammoniac. This procedure should be adopted for poisoning whether it be from inhaling carbon-monoxide or nitrous fumes, the object of the attendant being to expel mucus and gas from the lungs by the resultant vomiting. Without doubt effectual vomiting gives great relief and is a valuable safeguard against after-effects, particularly in nitrous-fumes poisoning.

2. In all cases of carbon-monoxide poisoning of any severity, oxygen should be administered.

3. When the man is unconscious, oxygen should invariably be given; and its use should be continued until consciousness is restored.

When breathing is obviously failing, artificial respiration must be employed as well. Either the Sylvester or the Schaefer method may be used. The former is commonly more convenient on the wet and uneven surfaces of mine ground, but the latter is more effectual and should be used when circumstances permit.

In desperate cases where breathing has ceased, it may sometimes be possible to use artificial respiration at the spot where the victim is found, provided that the noxious air has been completely blown out of the place. To do so requires courage and judgment, but it has saved life in at least one case within my knowledge.

NO PATIENT TO BE ALLOWED TO WALK HOME

4. The man, by extra covering, friction of the limbs, etc., must be kept warm throughout. He must not be allowed to exert himself too soon, because exertion may readily cause a dangerous aggravation of the effects of carbon-monoxide poisoning. Even when the effects of the poisoning are comparatively slight, the affected man should on no account be allowed to walk home. Hot and strong coffee should be given him, while alcohol should be avoided.

5. All cases of carbon-monoxide poisoning of any severity should be sent to the hospital, and this rule should invariably be followed where the circumstances suggest that the patient may have been poisoned by nitrous fumes. It is most important that these cases be kept under observation, because there is always a danger that acute symptoms may set in after an apparent recovery.

The medical attendant of the patient should be notified in all cases of exposure to gas, particularly when poisoning by fumes is suspected.

The emetics used do not always produce prompt and efficient emesis (vomiting), and if they fail in their work they may cause nausea and depression. In mild cases of carbon-monoxide poisoning two-dram doses of bicarbonate of soda have been found a useful substitute. The belching of gas, which it causes, produces the same result as the muscular contractions in vomiting.

For the more severe cases and in all cases of poisoning by nitrous fumes the use of apomorphine hypodermically is suggested. This drug is more reliable than others and promptly produces a vomiting which is, moreover, not too much prolonged. Apomorphine should be preceded or followed by an injection of strychnine or preferably pituitrin.

Where Advice Is of Questionable Value

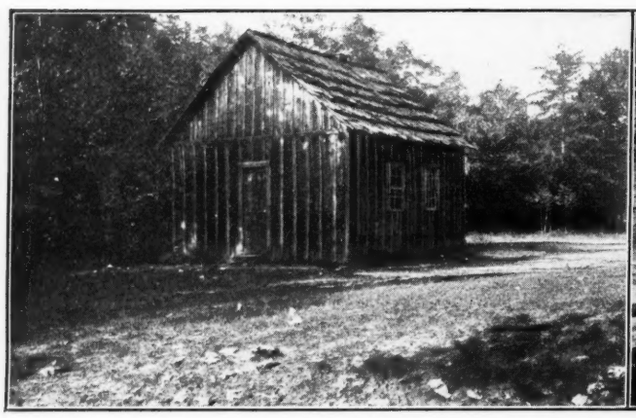
The advice is reprinted by *Coal Age* because it is full of excellent suggestions. The outlined rescue methods to a coal miner seem somewhat too careful and better adapted to the salvage of a mining machine or a submerged pump than the recovery of a human being for whose rescue some risks may well be taken.

The fear of carbon dioxide shown in rule 3 may be due to the fact that in most cases of poisoning from explosives and mine fires gas is likely to be accompanied by a deadly dose of carbon monoxide against which much care should be exercised. It is hardly necessary to be so careful where the source of the carbon dioxide is such that the deadlier gas is not to be apprehended. In most cases the man rescued with the care and delay recommended would be a subject for the undertaker rather than a patient for the doctor.

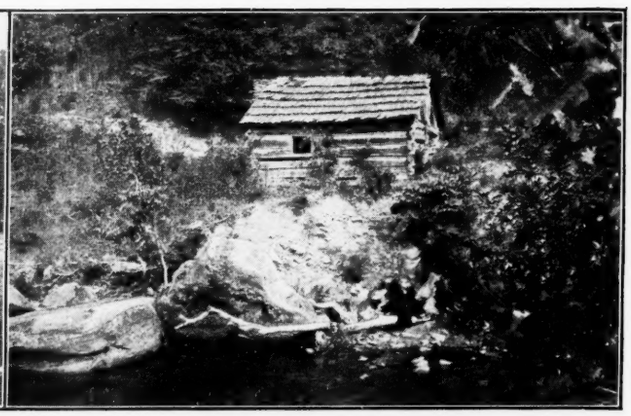
The doctor who writes this suggestion also lays too much value on a little compressed air. It is found that the discharge from an air line is not to be compared to an adequate air current such as can usually be provided in a well-ordered coal mine if it does not already exist.

The opportunity for the use of the Schaefer method in a level coal mine with its even floor is at least as good as that provided for the Sylvester method. But if the precautions for rescue which are suggested have been taken, there is no reason why a mechanical respirator should not be at hand by the time it is needed with, however, little hope of success that the asphyxiated patient will be revived after such a cruel lapse of time

Kentucky Before and After Development of Mines

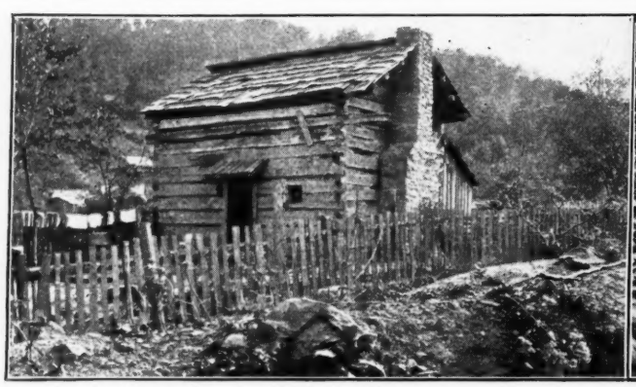


White Oak school for 40 mountain boys and girls



Picturesque but primitive school on Trace Branch

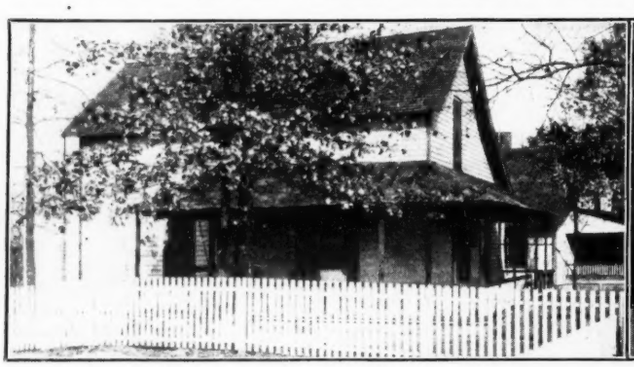
SOME SHACKS CALLED SCHOOLHOUSES UNDER THE CONDITIONS FORMERLY OBTAINING IN KENTUCKY

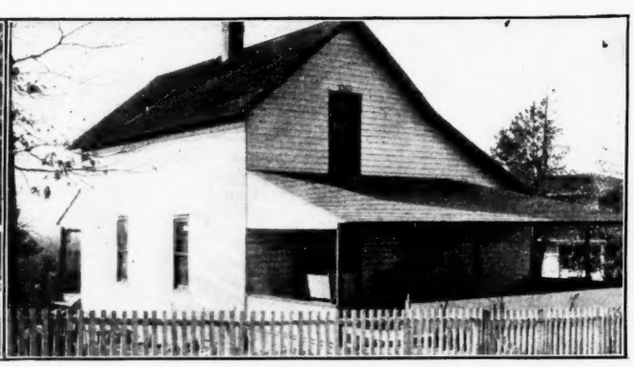


A settler's cabin located near the Winchester Cut

Preacher Hancock dwelt humbly in a vale of delight

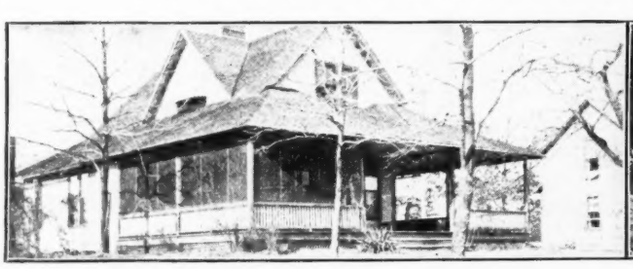
THE PRIMORDIAL DWELLINGS WERE NOT ONE WHIT MORE LUXURIOUS THAN THE SCHOOLHOUSES





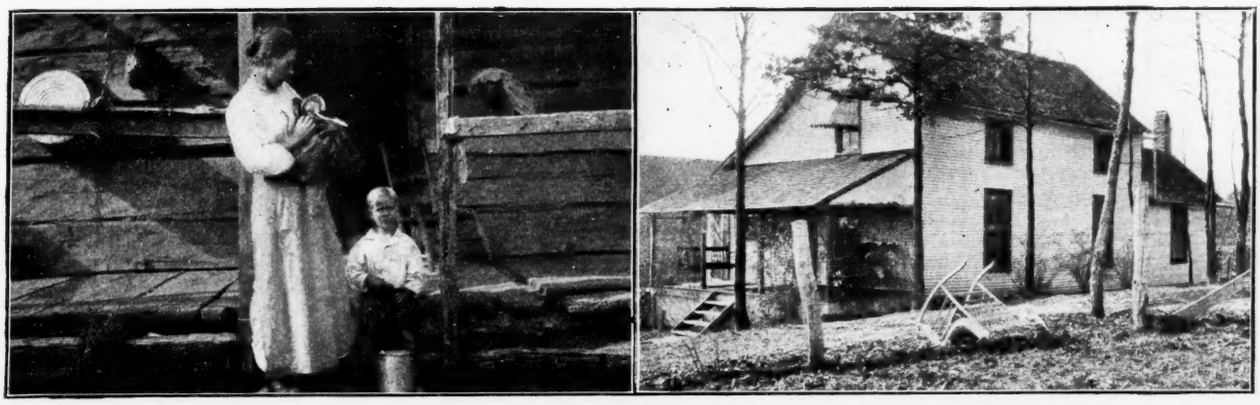
EMPLOYEES' HOMES CONSTRUCTED BY THE STEARNS COAL CO., LTD., IN THE SAME NEIGHBORHOOD

Houses neatly fenced and provided with adequate porches and the needed rooms for family life



SOME OF THE MORE PRETENTIOUS DWELLINGS BUILT BY THE SAME COMPANY AT ITS MINES

An air of order, self-respect and progress pervades the present spick-and-span Kentucky homes



THE OLD HOME AND THE NEW ON THE STEARNS COAL CO. PROPERTY IN KENTUCKY

Dodson Safety-First Campaign

In an effort to lower the number of "compensation cases" at their mines and thus to lower their premium rates, the operators are putting into effect many new safety-first ideas. The Dodson companies, operating collieries at Weston, Beaver Brook and Morea, have appointed one miner, one inside company man, one outside company man, the different foremen and the colliery superintendent as a colliery safety-first committee at each of their mines.

The three superintendents in turn report the result of their work to the general superintendent, and in this way ideas general to the three operations are made effective by the action of this final safety-first conference. Eight first-aid teams and a visiting nurse are supported by this company in its safety-first efforts.

All the anthracite companies are finding it a difficult matter to get the men to take the needed precaution with slight wounds. They resent the loss of time for what seems to them a trifling injury, but records show that it is a good practice to keep these men idle in order to safeguard them from infection. When seriously injured they must accept the needed care, but will disregard it in minor injuries if left to their own devices.

More Use for First-Aid Than for Safety-First

BY PENNSYLVANIA READER

Pete was a wild, careless, reckless fellow, but physically he was not anyway near a man. The mine foreman put him on as an extra brakeman. He was small and active, therefore he made good so far as making-up his trip was concerned. He was saucy to the workmen, often threatening to knock their heads of with a rock or club.

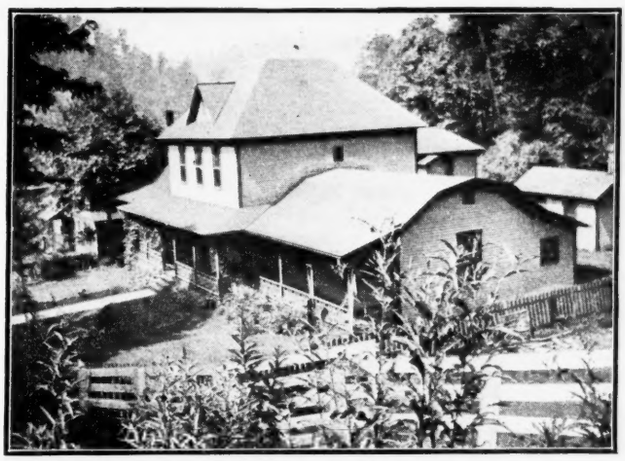
Many times he would not put on enough brakes to hold the trip in descending grades, and then he would swear at the motorman. But he stayed on the job long enough to get a motor to run, and that seemed to be the height of his ambition. It was not safe to be anywhere near him, for often he would come onto the side track with full power on his motor. At such times the side track was full of miners, with tools, dinner buckets and powder. He never gave his brakeman a chance; there was no limit to his speed.

Once his motor left the rails with a loaded trip behind it, struck and knocked out some timbers, but somehow he escaped without being injured. A short while later he was coming out of this same entry and his motor left the rails when he hit the switch on the main entry, striking the rib, which was solid coal.

The motor was almost buried with coal from the loaded cars behind, but again he was not hurt. The trip stopped so suddenly that the cars were buckled and twisted in every way. Some of them were left standing on their ends against the roof. This time his helper was caught between the cars and had one of his legs terribly lacerated, and it required great skill on the part of the doctor to save the limb.

A couple of weeks later a workman switched an empty car off the main entry to let another motor pass, and not knowing which motor would come first, he waited. Pete, our wild driver, was first out, with only his motor. The workman flagged him, but he made no effort to stop, struck the car and knocked it out on the main haulway and started to swear about the car being in his road.

He is still running a motor. Why? Because the boss says he can haul more coal than any other motorman he has. But let it be known that this company has a great deal more use for first-aid than it has for safety-first.



STONEGA HOSPITAL OF THE STONEGA COAL AND COKE CO., OPERATING IN WISE COUNTY, VA.

Discussion by Readers

Success in Mine Management

Letter No. 3—Speaking of success in the practical operation of a mine, I want to describe the manner in which a certain mine foreman handled a bad situation successfully and with little outlay, after the company had expended a considerable sum in various attempts to overcome the difficulty, at the suggestion of mine inspectors who visited the mine.

This mine was worked on the panel system, but ventilated by a continuous current extending from the force fan or blower on the east to the exhaust fan on the west. The panels were each 1,200 ft. long and 500 ft. wide. The mine was opened by driving the main entries due north and cross-entries were driven to the east and west of the main entries. The cross-entries had been worked out from the sixth east to the twelfth east in the first panel, and a second north entry had been driven beyond this panel and parallel to the main north.

It was this abandoned area lying between the sixth and twelfth east and the main and second north entries that gave all the trouble. The pressure of the blower fan on the east was so strong that the blackdamp from this abandoned section was forced out onto the main north entry to such an extent that it was impossible to keep a light on that entry, which was traveled by the men going in and out of the mine.

After other schemes had failed, as previously stated, the mine foreman got busy on a scheme of his own. He examined carefully and found where the blackdamp escaped in largest volume on the main north entry. Then he went into the second north and bratticed up all the openings leading to the abandoned section on that entry. Having done this, he next closed all the openings to that section on the main north, except the one just mentioned, where most of the blackdamp came out. In that opening he built a tight brattice or stopping, in which he inserted a 12-in. pipe, which he carried across the haulage road and into the main return entry. By this means the blackdamp was carried over the main haulage road and thus conducted out of the mine. The entire operation cost only one shift for two timbermen and was a complete success.

Detecting Gas by Smell

Letter No. 1—I was greatly interested in the letter of Joseph A. Greaves, *Coal Age*, May 6, p. 815, in regard to detecting gas by smell. I got my first experience in this line while working as mine examiner at Westleigh, Lancashire, England.

I recall one place in particular that gave off a large amount of gas. It was located on the main heading. It was a common thing for me to remark to the dayboss, "Well, Bob, how is that place today?" and he would answer, "It stinks." In that way we kept track of the amount of gas coming from the place, for it was not the same every day. By thrusting our heads into the hole and taking a sniff, we could tell how strong the gas was and about how much the place was making.

I have often heard it said that marsh gas has no smell, but whenever I repeated this to miners they have laughed at me. I remember one old fellow who answered me by saying, "Laddie, you have lots to learn yet; just put your nose in here and see what you think of it." I did as he said and found a peculiar smell. On putting my lamp into the place, I observed that a small percentage of gas was present, as indicated by the flame cap in the lamp.

While working here in Indiana I was passing through a place in the mine one day when I observed a hole in the roof. I said to the miner who worked there, "Do you ever smell gas in here?" He replied, "No. What are you taking about? Gas has no smell." I raised my head into the hole and, sure enough, I could detect the gas by the smell. I said to the miner, "Put your nose up there and tell me what it is like." He did so, and replied, "It does smell kind of funny, don't it?" I replied, "That is marsh gas," and to prove it to him, I got a safety lamp and showed him by the cap on the flame that there was gas in the hole. "Well," he said, "if that is marsh gas you can smell it all right."

It is a common thing for an old country miner working on a longwall face to say to his mate, "Watch and don't go by here, I can smell some gas up there and it is pretty strong." Now I want to ask, If it isn't gas that we smell at such times, what is it? I have smelled it so often and proved the presence of the gas by the lamp that I am curious to know if marsh gas has not a smell peculiar to itself.

JACOB RILEY.

Universal, Ind.

Letter No. 2—Referring to the inquiry, *Coal Age*, May 6, p. 815, I notice that readers are invited to give their experience in respect to the detection of gas by smell in mines. In my early experience in coal mining I was taught to do this by my father when working in the fiery mines at Nos. 1 and 2, Drocourt Co., Pas-de-Calais, France.

These mines were so gassy that no one under 18 years of age was allowed to work at the face, this being the first requirement, and one must also understand the use of the safety lamp. While the universal practice of the miners was to determine the presence of gas by the sense of smell, the safety lamp was always employed to ascertain the approximate level of the gas at the roof, but care was necessary not to raise the lamp too high into the gas to avoid its being extinguished should more gas be present than was supposed.

The lamp used in the mines mentioned was the Belgian bonneted Mueseler lamp, which was easily extinguished in a high percentage of gas. Lamps when extinguished could only be relighted by the lampman stationed in a shanty at the shaft bottom. It will be readily seen that every miner would exercise great care in handling his

lamp, in order to avoid the necessity of making the trip to the shaft bottom to have it relighted if extinguished.

It was the duty of my father and myself to erect brattice cloth to deflect the air and sweep out any gas that tended to accumulate in the working places and throughout the mine. This work had to be done not only before the men entered the mine, but also during the day while the men were at work. The regulations in this respect were very strict, for if the mine foreman or one of his assistants should find too high a percentage of gas in a working place, the miner was fined one franc (20c.). The same fine was imposed for bad or improper timbering of a place. "Safety first" was practiced in those mines. Everyone had to serve an apprenticeship of from three to five years under a competent miner before he was qualified to mine coal by himself, and every man in the mine was taught to detect gas by the smell. As previously stated, the diffusion of gas throughout the mine was very great. There were four seams being worked at the same time.

Later I was employed for a while in the afternoon shift, in a remote entry, my duty being to take down the top to make height on the road and to stow the waste on both sides of the track so as to support the roof. The seam was 80 cm. (32 in.) high, and enough top had to be taken down to make the headway 1 m. 70 cm. (67 in.). The miners left the working face at 1:30 o'clock, and as I did not reach the place until 3:30, two hours later, much gas had always accumulated, and my first duty was to sweep the gas from the place so that I could work. Before taking down any top, I would have to set props on each side and cut out such timbers as were in line with the road.

This work had to be done with great care and as the condition of the roof would permit. Often forepoling was necessary when taking down the top, some of which had to be wedged down. While thus engaged my movements back and forth would prevent the accumulation of gas, but when setting a crossbar over a prop cut to the right length, I had often to stand with my head in the gas. At times I would have to drop the timbers and throw myself on the floor for a while until I had recovered from the effects of the gas. This would not have occurred had I always taken the precaution to sweep the gas away before attempting to set the timbers, but in my hurry I frequently omitted to do this.

At another time, when working in No. 1 mine, at D'Ostricourt, Pas-de-Calais, I was not able to smell the gas, which was said to be *"blanc gaz,"* white gas. The rules were so strict that I never heard of a single case of suffocation by gas resulting in death. Only competent, qualified men were taken for work in the mine. In this country I have not found anything to compare with the safety regulations in the French mines, in respect to the qualification of miners.

Linton, Ind. PHILEMON WATTIAUX.

The Efficient Fireboss

Letter No. 7—The fireboss in a mine certainly holds a unique and peculiar position, and I believe, with "Old Fireboss," *Coal Age*, Apr. 29, p. 768, that much good will come from a discussion of the qualities that go to make up an efficient fireboss. I have read the letters thus far written with much interest.

My observation leads me to believe that the fireboss, in general, is considered a necessary nuisance by miners and operators alike. In a few cases the state legislature is blamed for having imposed the law requiring the employment of a fireboss in coal mines. For this reason, in addition to possessing the qualities and abilities that have already been mentioned, a fireboss must have an iron will that cannot be shaken. He must be a man that cannot be intimidated or forced to do what his judgment does not approve.

I recall an instance that shows the need of this quality in a fireboss. A miner whose place was reported as being unsafe for work demanded that the fireboss give him his check and allow him to pass in at once. On being refused, he would not listen to argument or reason and threatened to whip the man if he did not give him his check and let him go to his work. Had permission been granted, it is easy to imagine what disaster might have resulted.

Position of Fireboss Lightly Esteemed

Speaking of the relative responsibilities of mine foremen and firebosses, I believe that the position of fireboss should call for an age limit higher than that required for the position of mine foreman. I notice that there is a difference in the age requirements specified in mining laws of different states, although in many cases no mention is made of the age requirement. It would seem that too little attention has been given to this matter. While many companies would refuse to hire a young man to act as mine foreman in their mines, they would not hesitate to employ such a man for the duties of fireboss.

I agree with what "Old Fireboss" has said in regard to this official as being "the smallest paid man in the mine." Too often we observe a new fireboss installed in a mine every few weeks, because it is found that a man can make more money and have less responsibility on his shoulders by driving a mule or laying tracks, or digging coal as a miner. In my opinion, there are few mines where the fireboss is paid an adequate sum for the work he is forced to perform in order to fulfill his obligations to the state and the miners in his charge. A man who does not intend to stay long in the position of fireboss may often slight his work and make the rounds of a large territory, while a more conscientious man finds that he cannot complete his examination of the same section in the time allotted him, and as a result he is discharged, although the man last named is the more efficient fireboss.

One of the severest tests of the fireboss comes in a mine short of working places. If the fireboss marks out any of these places, the output falls below the requirement. The position of the fireboss is then a hard one, and in many cases he must sacrifice his judgment and yield to the demands of the foreman or lose his position, to say nothing of the opposition he meets from the miners who are kept from their work by reason of the unsafe condition of their working places.

A curious and annoying incident occurred in one of the mines in Illinois, where a fireboss was accused by the mine foreman of not doing his duty. The foreman claimed that the fireboss marked out places he had not examined, because when the bratticemen reached the places indicated by the fireboss they could find no gas

accumulated. In my opinion, the movement of the cars and the men, when the mine started to run, caused the diffusion of the gas, which quickly disappeared. However, the foreman did not accept this conclusion and changed the unlucky fireboss to another section, giving this one to one of his old "true boys." Later, when the same thing occurred again, he was convinced of his error.

Replying to the question of "Old Fireboss" as to whether it could be considered "safe to go into a place generating gas 9 hr. after the fireboss has made his examination," I would say, No. The place may have been safe when examined, but become very unsafe by the time the men go to work. The mining law should require that all such examinations of working places must be made within 3 hr. of the time the men go to work. Such things are very often permitted, however, until a great disaster occurs, when a new rule is at once adopted.

I want to urge, in closing, that operators and miners both should be more considerate of the difficulties and perplexities of the fireboss. They should know that a careful man is worthy of their respect and confidence, and will make his own pay many times over if he is given a chance. I believe that this discussion will throw much light on a matter that has received thus far too little attention.

OSTEL BULLOCK.

Cleaton, Ky.

The Miner and Safety First

Letter No. 11—The subject of the Foreword and also that of Inspector Nicholas Evans' article in *Coal Age*, Apr. 22, p. 707, is of such vital importance in the reduction of serious and fatal accidents in and around coal mines that it cannot be too strongly emphasized nor given too much consideration by mine operators, inspectors and mine officials.

To those who are acquainted with coal-mining operations as they were conducted thirty or thirty-five years ago, the present methods present a very striking contrast with respect to the manner in which life and property are safeguarded. Statistics, however, do not present such a proportionate reduction in accidents as these improved methods would seem to warrant. To what cause this disparity is due may not be difficult to ascertain. Formerly a mining operation, however large, was looked after by the foreman alone, and it was an unusual occurrence and one of great moment that would necessitate his presence in the mine more frequently than once a month at the time he measured up the yardage.

Such a condition of affairs required greater proficiency and experience on the part of the miner who was his own guardian. The men who dug coal at that time were largely of the Anglo-Saxon race, and their proficiency in mining was the result of an experience that began as soon as they were able to carry a dinner bucket and follow their fathers to the mine. Each individual was under the instructions of either a parent, an older brother or a personal friend until he was sufficiently adept to take charge of a place himself. Thus, necessity was practically the mother of experience.

Under these conditions, each miner became so well acquainted with the hazardous nature of his occupation and the cause of the most frequent and common accidents in mines that he fully realized the necessity of exercising, if not eternal vigilance, at least such a degree of it as would safeguard his own life and that of others.

The present class of coal miners do not possess these qualities to the same extent and hence arises the necessity of surrounding them with legal restrictions and safeguards and constant supervision. With the enlargement of the coal-mining industry such precautions have become increasingly imperative through the introduction of modern devices and machinery. While it may be claimed that these innovations have increased the dangers incident to coal mining under the old system, from personal experience I am convinced that the larger number of accidents in coal mining today are the result of carelessness and recklessness on the part of employees more than of their ignorance because of a lack of needed instruction and proper supervision of the work by mine officials.

Persons not actually engaged in the mining of coal or the supervision of mining work cannot fully appreciate the difficulties encountered in the proper care and handling of this class of workmen. Instructions as to the proper precautions to be taken with reference to safety, even when given through an interpreter, are for the most part regarded only as one means by which imposition is practiced on the miner.

The only plausible reason that I would be inclined to give to account for the prevalence of such an opinion is the inability of many miners to comprehend that the measures taken are for their personal, physical well-being and are not the result of any desire of their employers or of the mine officials for increased financial profits at the miner's expense. If by any means the fact could be brought home to the miners in a formidable and emphatic manner and made clear to their comprehension that safety laws are enacted for their welfare and that the proper observance of those laws is necessary to prevent injury and possible loss of life, the result would be a great reduction in accidents.

Miners Lack Sense of Personal Responsibility

The present-day coal miner, of whatever nationality he may be, knows well that his employer must exercise a certain degree of supervision over him and his work and will be held legally and financially responsible for any accident that may occur to him during his hours of employment.

The knowledge of this provision in the law, instead of emphasizing the dangers to which the miner is subject and against which he should take proper precautions, induces a more reckless evasion of rules and disobedience of instructions. In common life, ignorance of the law is not accepted as an excuse for its violation, and few will deny that such a plea if accepted destroys a miner's sense of personal responsibility and makes neither a safe miner nor a safe mine. Since such conditions exist, however, the best way to impress the idea of personal responsibility on each and every mine worker is, as suggested by Mr. Evans, "discipline" in the mine.

Here the question arises, What form of discipline will be effectual in a mine? Moral suasion, reprimanding and the loss of time have all been tried as a means of establishing discipline, but none of them has proved effective. The first two have, practically, no effect whatever, and the last is not even regarded by the average miner as a monetary loss but more in the light of an additional holi-

day, and can never be made effective unless extended over a longer period of time, the loss of which would be equally as detrimental to the employer as to the employee. The most sensitive point in the composition of the modern coal miner is his pocketbook, and the best way of reaching his intelligence and commanding his compliance with rules and instructions is to make him suffer a direct monetary loss. This may be a crude method of enforcing compliance with laws or safeguarding life and property; but under the given conditions it is the only method that appeals to a thoroughly material understanding.

Mine Officials Lack Power to Prosecute

The suggestion that assistant foremen should be men who have had practical experience at the working face is an excellent one, and the same requirement should be made of all mine officials. The hearty coöperation of mine inspectors would greatly help to bring this condition into operation. It strikes me forcibly that the efforts of assistant foremen could be made more effective in maintaining discipline if their status in the enforcement of the mine laws were more definitely specified and they were allowed a greater freedom of action in the exercise of that power.

I would suggest that for the purpose of establishing and maintaining discipline with respect to the proper observance of mine laws and regulations, every mine official and assistant should be empowered to prosecute violators before the nearest Justice of the Peace or other tribunal, and that the expense of such prosecution should be borne in the same manner as it now is in the case of such proceedings by mine inspectors. Such a method as this may not result in making a safe miner, for something besides compulsion and blind obedience is necessary to produce results, but it will most certainly cause a great reduction of accidents from carelessness and recklessness.

——, Penn. A. M. Iner.

Letter No. 12—According to the report of James E. Roderick, Chief of the Department of Mines of Pennsylvania, greater safety is provided by large companies, who are well able to safeguard the lives of their employees in a more thorough manner than is possible in small operations.

While it is quite readily admitted that large companies can protect the lives of their employees better than companies operating on a smaller scale, I would like to ask, Do they do it? I acknowledge that some of the larger companies operating in the anthracite field have specialized in safety appliances and equipment. On the other hand, at many of the small mines is still to be found the old medicine chest, and investigation will show that 98 per cent. of the men in the mine could not put a roller bandage on a mule's tail. Only a few months ago I saw a man with a sprained ankle attempting to instruct a driver boss how to bandage his foot, and the result was a doubtful success.

All mine foremen and officials, as well as every mine worker, should understand the main principles of first-aid work and be ready when the call comes, as it may any day in the mine, to render the assistance needed. Many an injured man has died before aid could reach him because his fellow workman lacked this knowledge.

Since the passage of the new Compensation Law in this state, all we hear is "safety first." But what good does it do to raise the cry, "safety first!" when safety is the last thing in the thoughts of the foreman as he rushes about the mine bent on getting out the coal at all hazards? The foreman and his assistants must set the pace if they expect the men working in the mine to follow their instructions.

As an illustration of this need I will cite an incident that happened only three weeks ago at a certain mine. One of the assistant foremen, on his way out of the mine for dinner, rode up the plane on a loaded trip, instead of walking up the manway. He had a large brass lamp he was carrying to the surface. Following his example, a tracklayer and his helper, carrying their tools, which weighed some 75 lb. altogether, rode the same trip. Arriving at the surface, they were hailed to the mine foreman, who immediately suspended them until further notice.

The safety-first rules in mining are numerous, but I wish to mention briefly two or three points and impress their importance on every mine worker. First, when a foreman or one of his assistants, or a fellow-workman, is explaining something to a foreigner, or giving instructions in respect to safety, don't speak to him in broken English, but use plain United States, and if he does not understand and asks again, don't curse him and call him a "bonehead" or a "numskull," but treat him kindly and patiently. Tell him again more carefully and some day he will thank you for it.

Precautions Necessary for Mine Safety

It ought not to be necessary to caution a mine foreman or any mine official against walking into a section of the mine where only locked safety lamps are permitted and matches are forbidden, without complying with these regulations strictly. The remark is often made that a spark will not ignite firedamp, and it has happened that a foreman in his rounds, having a locked safety lamp hanging at his belt, has entered such a section with a lighted pipe in his mouth. Such incidents may be the hidden cause of many mysterious explosions that have from time to time taken place in mines and which could not be satisfactorily explained.

When passing through a door see that it slams to behind you. A piece of coal carelessly kicked aside may prevent the door from closing tight. A door found standing open should call for immediate investigation as to its cause, unless the foreman's mark shows that it is to remain open. The door should not be closed, however, before ascertaining if the conditions are safe. The men at work in those entries in which the circulation is controlled by the door and where the air current has been temporarily short-circuited by its standing open should be notified at once before closing the door. These precautions may save the life of a work fellow and possibly prevent an explosion in the mine.

In closing, I want to say a word to the miner who is prone when he finds a bad joint in the road, or some other unsafe thing that he could remedy in a few minutes, to pass it by and leave it for the man appointed for that work. It may cost a little extra effort, but may save the life of a fellow-worker, a driver or a triprunner. It is the plain duty of every man working in a mine to do what he can to avoid and remove these chances of accident to his fellows and make the mine safe for work.

Plymouth, Penn. A. Miner.

Inquiries of General Interest

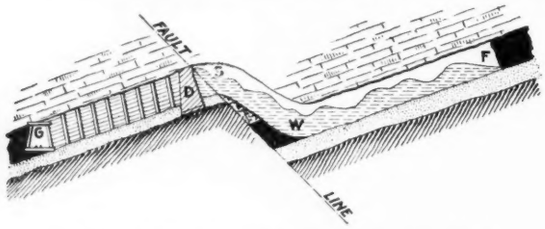
Air or Water Blast in Mines

Kindly advise if there is any record of an air or water blast having sufficient force to destroy a mine dam built to withstand the head of water possible under given conditions. It is sometimes claimed that, as water accumulates behind a dam in a mine, the air entrapped in rise workings is compressed until it reaches a pressure that causes it to force its way out through the water with a rush. Does this rush of air exert any force in the open mine workings? Kindly explain the cause and effect of such an occurrence in a mine.

I have in mind a place where the seam dips for a mile going into the mine, and is then worked for a mile to the rise beyond the dip. In retreating, the pillars are being drawn outby from the dip, and the water is left to fill up the abandoned workings. Under these conditions, is there any danger of a rush of air taking place through the water from the rise workings in which it is entrapped?

Punxsutawney, Penn. FIREBOSS.

A destructive air or water blast could hardly occur under the conditions described in correspondent's letter. Assuming that the water has accumulated in the dip to such an extent that a considerable body of air is entrapped



SECTION OF A FAULTED SEAM OF COAL

in the old rise workings beyond the dip, as the water rises this air is compressed and the air pressure is equal to the head of water it sustains, or the difference in water level on either side of the dip. This pressure, at the most, could not be very great, and the worst that could happen would be a slight rush of air and a corresponding agitation of the water, caused by a possible heavy fall of roof in the rise workings.

What is commonly known as an "air or water blast" in mines is clearly illustrated in the accompanying figure, which shows a faulted seam of coal that has been worked to the rise at *F*. As shown in the figure, a dam *D* has been constructed a short distance up the pitch from the gangway *G*, and in such a position that the accumulation of water from the rise workings at *F* has entrapped a considerable body of air in the space *S*.

As long as everything remained quiet there would be no particular danger from this cause; but assuming a fall of roof to occur in the rise workings sufficient to agitate the water, there is at once set up a strife between the water *W* and the air entrapped in the space *S*. The air and water tend to change places, and the movement of the water becoming more violent displaces some air, which at once causes a greater agitation in the body of water accumulated above the dip. Billows of water strike the dam at *D*, which is liable to be destroyed by the force of the impact.

Dried, Powdered Lignite as Fuel

Can you give me any information in regard to an arrangement that I understand is being thought out in connection with dried, powdered lignite, for use in railway locomotives, or state where I can secure such information? W. J. MORTON.

Tofield, Alta., Canada.

As is well known the chief difficulty experienced in the burning of lignite arises from the large percentage of moisture content, which reduces the temperature of combustion and the heat value of the coal, or B.t.u. per pound of fuel burned. It is possible, however, to eliminate a large proportion of this moisture in the process of drying the coal, and the fuel value of the dried product is thereby greatly improved.

President D. C. Buell of the Union Pacific R.R., in his annual address, before the International Railway Fuel Association in Chicago, May 15, 1916, spoke at considerable length on the rapid progress made in the burning of powdered coal on locomotives and in power plants. He stated that the Chicago & Northwestern Ry. is now operating regularly, between Chicago and Milwaukee, a passenger locomotive burning powdered fuel. Tests made with dried powdered lignite on this locomotive showed that this grade of fuel can be used with great advantage on roads operating in the Northwest and other lignite fields where the cost of bituminous coal is high.

The burning of powdered coal in furnaces has the advantage of increasing the efficiency of the combustion, as a larger percentage of the heat value of the coal is developed by that means than when the coal is burned in a solid form. The powdered coal is blown into the furnace and burned in suspension in the air, being converted into gas. The method maintains a more uniform and higher temperature in the furnace, while slightly increasing the cost of maintenance, owing to the more rapid deterioration of the furnace walls and occasional fusing of the grate bars. But these difficulties are now being rapidly overcome.

The patents for the burning of powdered coal were originally owned by the American Steel Co., and the process was installed in its plant at Lebanon, Penn. Later, these patents were purchased, and are now owned by the Quigley Furnace and Foundry Co., New York City, which has since installed the process with great success in numerous large plants.

Stokers have been used to feed the furnaces of some ponderous freight locomotives, thus enabling them to perform greater service than was possible with hand firing. It is probable, however, that the burning of powdered coal will soon become general locomotive practice.

Examination Questions

Mine Examiners' Examination, Springfield, Ill., Jan. 10, 1916

(Selected Questions)

Ques.—What are the duties of a mine examiner?

Ans.—The duties of a mine examiner (fireboss) in Illinois, as given in Section 21 of the Coal Mining Laws of that state, are as follows: 1. To examine the underground workings of the mine within 12 hr. preceding every day upon which the mine is to be operated. 2. To carry a safety lamp in proper order and condition and a rod or bar for sounding the roof. 3. To see that the air current is traveling in its proper course and sufficient volume, and to measure the air passing in the last crosscut of each pair of entries, or the last room of each division in a longwall mine, and to note these measurements in a book kept for that purpose. 4. To inspect all places where men are required to pass or to work, noting dangerous roof or accumulations of gas or other obstructions in rooms and airways, and to examine the edges and accessible parts of recent falls and old gobs and aircourses. 5. To mark on the walls of each place, not on the face of the coal, the date of visit. 6. To place a conspicuous danger signal at the entrance of each place found to be dangerous, two such danger signals to be placed, not less than 20 ft. apart, across the roadway leading to a place where gas has been found. 7. To record the results of each examination in a book kept for that purpose, before permitting the men to enter the mine in the morning. 8. To take possession of all entrance checks of men whose working places have been found to be dangerous, giving these to the mine manager (foreman) before the men go into the mine in the morning.

Ques.—What pressure, in inches of water gage, will be required to overcome the friction per square foot of the rubbing surface of an airway 8 ft. high, 14 ft. wide and 5,790 ft. long, the velocity of the air being 1 ft. per min.?

Ans.—This question is poorly worded and does not express what is probably intended to be asked. The pressure required to overcome the friction per square foot of rubbing surface, for a velocity of 1 ft. per min. in the airway, is the well-known unit of resistance or so-called "coefficient of friction," namely, 0.0000000217 (Atkinson); 0.00000001 (Fairley). The Atkinson coefficient has now been abbreviated to 0.00000002. These coefficients all express the pressure, in pounds, per square foot of rubbing surface, per unit velocity. It would be impracticable to express this in inches of water gage, as the result would be too small to read on a water gage.

The question probably intends to ask, What water gage will be required to produce a velocity of 1,000 ft. per min. in an airway 8x14 ft., 5,790 ft. long? The answer to this question is found as follows:

$$w.g. = \frac{0.00000002 \times 2(8+14)5{,}790 \times 1{,}000^2}{5.2(8 \times 14)} = 8.75\ in.$$

Ques.—An airway is 7 ft. high and 8 ft. wide, and the rubbing surface per square foot of section is equal to the number 2,684. What is the length of the airway?

Ans.—The sectional area of the airway is $a = 7 \times 8 = 56$ sq.ft., and its perimeter, $o = 2(7 + 8) = 30$ ft. Then, since the rubbing surface is expressed by the formula $s = lo$, the rubbing surface per sectional area is

$$\frac{s}{a} = \frac{lo}{a} = 2{,}684$$

Hence for the length of this airway we have

$$l = 2{,}684\left(\frac{a}{o}\right) = \frac{2{,}684 \times 56}{30} = 5{,}010\ ft.$$

Ques.—If a circulation of 120,000 cu.ft. of air per min. is obtained with 112 hp., what power will be required if the quantity be reduced to 100,000 cu.ft. per min.?

Ans.—In any circulation the power on the air varies as the cube of the quantity of air circulated. In other words, the power ratio is equal to the cube of the quantity ratio. Hence, calling the required horsepower x, we have, in this case,

$$\frac{x}{112} = \left(\frac{100{,}000}{120{,}000}\right)^3 = \left(\frac{5}{6}\right)^3 = \frac{125}{216}$$

$$x = \frac{112 \times 125}{216} = 64.8\ hp.$$

Ques.—Why are some safety lamps more sensitive than others?

Ans.—The sensitiveness of a lamp to gas is determined largely by its type or form of construction with respect to the admission of air at points above or below the flame. When the air is admitted below the flame, the circulation within the lamp is all upward, which increases both its illuminating power and degree of sensitiveness to gas. When the air is admitted to the combustion chamber above the flame, the resulting descending and ascending currents conflict, causing the flame to smoke and altering the gaseous condition within the lamp, thereby rendering it less sensitive to gas. Also, the oil burned in the lamp, whether a volatile or a nonvolatile oil, and its degree of purity affect the sensitiveness of the lamp to a marked degree. A bonneted lamp is always less sensitive to gas than an unbonneted lamp. The large gauze area of the Davy lamp renders it more sensitive to gas than any other type of lamp burning a nonvolatile oil. Lamps burning alcohol or hydrogen gas are extremely sensitive to gas, but possess the disadvantage of being easily extinguished in a body of strong gas.

Ques.—What are the principal gases liberated when a charge of black powder is exploded?

Ans.—The constituents of black powder are potassium nitrate, carbon and sulphur. In the cheaper powders, potassium nitrate is replaced by sodium nitrate. When powder burns, the oxygen in the nitrate combines with the carbon to produce varying amounts of carbon dioxide and carbon monoxide, and these with the nitrogen set free form the principal gases of the combustion, while the potassium or sodium of the nitrate unites with the sulphur to form a sulphide and some carbonate and sulphate of these bases are formed, while some free sulphur remains unburned.

Coal and Coke News

Washington, D. C.

Freight tariffs of the Chicago Great Western railroad proposing increased rates on bituminous coal to Red Wing, Minn., have been suspended by the Interstate Commerce Commission until Sept. 17 next. The increases were proposed to take effect May 20, but the Commission has suspended them pending an investigation into their reasonableness.

The Interstate Commerce Commission has dismissed the complaint of the Pocahontas Coke Co., Inc., of Bluefield, W. Va., against the Norfolk & Western and other railroads. It was pointed out in this case that charges are based on rates for the transportation of a carload of coke from Pocahontas, Va., to Greensboro, N. C., reconsigned thence to Greenville, S. C. The commission held that the charge was not unreasonable.

Advances in the rates on bituminous coal in carloads from mines on the St. Louis, Iron Mountain & Southern Ry. in Illinois to stations on the Missouri Pacific Ry. in Missouri have been declared reasonable in a decision recently issued by the Interstate Commerce Commission. The old rates range from 87c. to $1 per ton, whereas the new rates approved by the Commission range from 90c. to $1.20. The higher rates will take effect July 1 next.

HARRISBURG, PENN.

The Attorney General's Department has informed the chairman of the Workmen's Compensation Board, that corporations entitled to carry their own insurance need not file bonds with the board or the state treasurer, if the statement of finances is satisfactory to the board. One corporation sent a bond for $15,000 to the board as an evidence of its promise to carry its own insurance. The bond was taken to the state treasurer, who refused to accept it and be held responsible for its keeping. The case was then taken to the Attorney General's Department for an opinion. The bond will be returned to the corporation.

The compensation board ruled on May 20, that coal mining is a continuous and not a seasonal employment under the meaning of the Compensation Act.

Considerable protest is being heard to the plans of the chairman of the Compensation Board to have certain changes made in the Compensation Act during the 1917 session. It is argued that the act should have a fair trial such as has been given the 1911 bituminous code and the school code.

The part which medical men should take in discussion of questions arising out of the administration of the Workmen's Compensation Act and proposed bills for health insurance, which will likely occupy some attention in the next session of the General Assembly, formed a theme at the hygiene conference held at the Capitol during the past week, under the auspices of the state.

One of the matters discussed was what the medical men should do in regard to determining major and minor operations under the compensation law, and how they could assist the officials charged with the administration of the act.

The act stipulates that the maximum remuneration for a physician performing a minor operation shall be $25 and for a major operation the maximum charge may be $75. So far they seem to be all "major operations." A committee of surgeons has been appointed to draw up a report on this question.

It was also announced at the meeting that a clinic for the study of diseases and accidents exclusively is to be established by the coöperative effort of Dr. Alfred Stengel, professor of medicine, University of Pennsylvania and state officials, and has brought much commendation.

The studies and clinics will attract physicians and surgeons, interested in the treatment of industrial accidents. The findings of the clinic and its investigations will have a direct relation to workmen's compensation as already the board has been called upon to decide whether some afflicted workers have been injured in their employment within the meaning of the act or whether they are suffering from diseases or infections not subject to compensation. Studies will be made to determine the effects of coal dust on mine workers.

PENNSYLVANIA

Anthracite

Hazleton—Finding it no longer profitable to mine coal through its No. 2 shaft at Yorktown colliery the Lehigh Valley Coal Co. has abandoned that section of the mine.

Wilkes-Barre—Three men were severely burned recently by an explosion in the Loomis colliery. So far the officials have been unable to determine whether the explosion was due to gas or powder.

The bodies of four men buried since Mar. 9 by an explosion of gas in the Hollenback colliery have recently been recovered. The mine in this section caught fire at the time and was flooded to prevent a disaster. The body of another miner has not as yet been found, although he was known to have been with the others at the time of the explosion.

Mahanoy City—The police have ordered 27 families out of their homes at Maizeville in the vicinity of the Stanton colliery, on account of the danger of sinking into the mine. Already three houses with all their furnishings have been swallowed up, while the Greek Catholic Church and several schools are in danger of being engulfed.

Determined to prevent contract miners from cutting and mining coal on idle days, union pickets were out in force on May 20 stopping miners and laborers from going to work, forcing them off all trolley cars, motor-trucks and other conveyances. In some sections there was intense excitement when the women and boys joined the union pickets, and stoned and pelted the workers, forcing them to return home.

Mayfield—Joseph Chublin, 5 years old, was engulfed and buried alive together with his pet goat, while at play by the sudden cave-in of the old workings of the Stanton colliery on May 16. During the night the cave-in extended, carrying houses occupied by three foreign families into the breach. The occupants escaped with their lives, but had little time to save much. The widowed mother of the Chublin boy lived in one of the houses.

Shamokin—The Susquehanna Coal Co.'s Cameron colliery was tied up, when 1,000 miners struck because the company discharged 30 men, who quit work, after working less than 8 hours. The company insists that, according to the new agreement employees must work the full 8 hours.

Pottsville—The case of the Dodson Coal Co., which sued Warren and Frederick Delano for $200,000 damages, was decided adversely to the plaintiff, on May 18, by Judge Bechtel. The suit has been pending for years and is the result of the decision of the Supreme Court ordering that a barrier pillar of 300 ft. be maintained between the Morea colliery, operated by the Dodson Coal Co. and the Mill Creek colliery, adjoining because of a large subterranean lake, which would endanger the lives of miners if the pillar was weakened. The Dodson company blames the Delanos for the accumulation of the water.

Pittston—The annual examination of candidates for certificates as mine foremen and assistant mine foremen in the Eighth and Ninth anthracite inspection districts will be held on June 6 and 7 at the Pittston Y. M. C. A.

Eight-hundred employees at the Henry and Wyoming shafts, Prospect colliery, Lehigh Valley Coal Co., were recently thrown idle by the strike of driver boys over the institution of the 8-hr. day. The boys returned to work, pending disposition of their grievance.

Seventy thousand dollars was paid to the employees of the southern division of the Pennsylvania and the Hillside Coal and Iron Co. (Pittston and its vicinity) on May 20, representing the application of the wage increases granted by the new agreement to the earnings of the men for the month of April.

Officials of the Lehigh Valley Coal Co. have announced a change in the half-hour period allowed mine workers for luncheon from 12 to 1 o'clock. By this arrangement the men work four hours before lunch time and four afterward. The real reason for the change is to obviate as much as possible the desire of the miner to stop once or twice during the morning to take a bite of lunch.

Tamaqua—After being idle since May 3, the employees of the Lehigh Coal and Navigation Co., voted on Friday evening of last week to return to work the following Monday. The company agreed with them to allow miners to go home at any time if they worked in wet, hot, or poorly ventilated places, or were sick, and the agreement further allowed them to quit earlier than the regular eight-hour day, for other causes not specified. This is practically the old working condition. The drivers will have their mules cleaned and harnessed for them by the stablemen in the morning and the latter must see to housing the stock at night, the drivers must keep their teams out of the barns for the full eight hours. The company has difficulty in operating the mines due to the large numbers of men who have quit. It is said that 1,700 men is a conservative estimate of the employees who have left. Labor trouble in this valley is not at an end as the outside laborers are dissatisfied with their wages, and are taking steps to organize a separate union.

Reading—The Anthracite Drifted Coal Co. of this place is taking out daily large quantities of drifted coal from dams along the Lehigh River.

Bituminous

Kelly's Station—During the electric storm Sunday, May 14, the transformers in the plant of the Kittanning Electric Light Co. were burned out. As a result the coal mines at Glenn, Logansport and Kelly Station will be laid up for more than a week pending repairs, about 200 men being idle in the meanwhile.

Scottdale—All bids for the 200 new houses planned for the various plants of the H. C. Frick Coke Co. were rejected when the bids were opened in the office of Thomas W. Dawson, chief engineer. The houses were to be of six, eight and twelve rooms, with modern improvements, representing an outlay of about $400,000. Because of the scarcity of labor and the high prices of materials, it was decided to postpone the construction of the houses for the time being.

Pittsburgh—The Jenner-Quemahoning Coal Co. has appealed from the assessment on its property alleging that it is too high in comparison with that of other properties and that discrimination had been made.

It is reported that 50,000 miners of the Pittsburgh district went on strike May 23. Every mine is closed down. The recent wage agreement signed by officials representing the miners, which included a 5 per cent. increase in rents and an increase in powder for the men, is the cause of the strike. A convention of the miners will be held in the Union Labor Temple here. Some of the more radical of the miners favor ousting the officials of the union who signed the new wage scale. The miners accepted the scale as agreed to by the union officials, but the dissatisfaction arose after the first pay day. If a new scale is drawn up it will not become effective until June 10, and not a mine in this district will be working until that time.

Uniontown—The assets of J. V. Thompson, former president of the First National Bank of Uniontown, amount to $65,714,305, while his liabilities total $33,178,862, according to a report filed on May 19 by the receivers who were appointed when the bank was closed in January, 1915.

Connellsville—The coke trade is normal again, the output being 440,000 tons during the week ending May 19. The production and shipments ran even. The car supply was ample, but there is still a shortage of labor. Of the 39,000 ovens in the two regions approximately 35,000 are in operation.

Clearfield—The Empire Coal Co. has purchased the Garman tract of coal lands next to the Empire mines at Barnesboro. The purchase of this property means that the Empire mines will be good for another 25 or 30 years and will give employment to about 250 men.

WEST VIRGINIA

Wellsburg—The West Virginia-Pittsburgh Coal Co. had the largest payroll in the history of its mines in Brooke County for the week ending May 5. The great need of the company at the present time, and has been for months past, is more dwelling houses for its employees. While quite a number are building, there is still a great shortage of houses, not alone for the coal miners but for mechanics and workmen.

Williamson—The Williamson Coal and Coke Co. will install another unit of 250 hp. in its power plant.

Carbon—The Carbon Coal Co. will build a new substation at North Carbon to replace the one recently burned.

Beckley—On Tuesday evening, May 16, the Winding Gulf Operators' Association tendered a banquet to the New River operators and to its Beckley friends. W. P. Tams, Jr., president and general manager of the Gulf Smokeless Coal Co., acted as toastmaster.

Bluefield—The Clinchfield Coal Corporation's Hungarian band, which has been at Allentown, Penn., during the winter months, is now at Dante, Va., where it will remain during the summer.

Northfork—Fire of unknown origin on May 19 destroyed eight houses and two shanties at Northfork Hollow, about 4 mi. from here. The fire was first discovered in a row of houses occupied by miners and owned by the Arlington Coal and Coke Co. and later spread to two shanties occupied by section hands of the Norfolk & Western Ry. The total loss was estimated in the neighborhood of $10,000, partly covered by insurance.

Clarksburg—The prospects are bright for a busy time in this region during the next several months. The car supply is good and large quantities of coal are being moved with little delay.

VIRGINIA

Toms Creek—The Toms Creek Hotel, owned by the Virginia Iron, Coal and Coke Co., was destroyed by fire on Monday, May 15, entailing a loss estimated at $6,000. Nothing was saved from the building, and many of the guests, most of whom were employees of the coal company, lost heavily.

KENTUCKY

Lexington—J. E. Butler, of Stearns, Ky., was recently elected president of the Kentucky Mining Institute at the meeting held here, and the following other officers: Vice-presidents, K. U. Meguire, Louisville; B. R. Hutchcraft, Lexington; H. T. Eaton, Straight Creek; H. M. Ernst, Sturgis; C. E. Taylor, Greenville; Wilbur Miller, Cincinnati; R. F. Cole, Fleming; H. G. Van Hoose, Majestic; secretary-treasurer, Ivan P. Tashof, Lexington; assistant secretary, J. W. Reed, Lexington. An increase in the annual dues, to affect only the mining men, was voted, while the organization went on record as favoring a joint meeting with the West Virginia operators and favored Cincinnati as the meeting place.

Winchester—Following the filing of an involuntary petition in bankruptcy against it in the Federal Court at Covington, the big new plant of the Pearsite Co., at Clay City, Ky., has closed down and the 300 or 400 employes laid off. A contractor with a claim on the plant and other creditors took the action. It is stated that the company, which makes dyestuffs out of cannel coal, was unable to finance the proposition adequately on account of conditions in the English money market. Arthur L. Pearse, of London and New York, is at the head of the company.

Candwell—The Noble mine of the New Cambridge Coal Mining Co. has placed in operation after an idleness of several months. In all 100 miners are given employment and the output is 500 tons daily.

PERSONALS

W. E. Brownlee, for the past year with the Peabody Coal Co., of St. Louis, Mo., has taken a position with the Moffat Coal Co.

Frank F. Rash, vice-president of the St. Bernard Mining Co., Earlington, Ky., was delegate from the Kentucky Manufacturers' Association to the meeting of the National Association of Manufacturers.

E. B. Graham, secretary of the Hisylvania Coal Co. and a number of subsidiary concerns, has resigned. He has been succeeded by E. W. Blower, son of J. W. Blower, president and treasurer of the companies.

Miss Margaret McTigue, stenographer of the Boehmer Coal Co., won first prize in a contest conducted by the St. Louis "Republic" for the most popular stenographer in St. Louis. She received 1,763,310 votes. The prize was $200.

John D. Jones, of Wilkes-Barre, has been appointed mining engineer in the office of the Luzerne County assessors at a salary of $3,000 a year. His employment will be continuous. Formerly a board of four engineers, sitting at intervals, made the coal assessment.

H. C. Reynolds, who has been connected with the Detroit and Pittsburg Coal Co. for a number of years, has been appointed manager of sales for the Superior Colliery Co., with headquarters in the main office of the company, Hammond Building, Detroit, Mich.

William Weaver, of West Pittston, a fireboss in the Exeter colliery of the Lehigh Valley Coal Co., while making his rounds of the mine early in the morning on May 18 was caught under a fall of rock, suffering a fracture of the wrist and bruises about the body. Fortunately for Weaver another fireboss was close by at the time and succeeded in rescuing him. His condition is not critical.

W. H. Clingerman, president of the United States Coal and Coke Co., L. H. Burnett, assistant to the president of the Carnegie Steel Co., D. J. Kerr, vice-president of the Bessemer & Lake Erie R.R., and also vice-president of the United States Steel Corporation, together with Dr. O'Neill Sherman, visited Bluefield, W. Va., and coal fields in the vicinity on May 17 and 18 on a general inspection trip of the United States Steel properties on the Tug Fork branch.

OBITUARY

Louis C. Neid, chief auditor of the Maryland division of the Consolidated Coal Co., with offices in Frostburg, Md., committed suicide in the cellar of his residence at Frostburg on May 21. Mr. Neid was 42 yr. old. He had been ill since last October when his skull was fractured and he was otherwise injured in an automobile accident in which two other persons were killed.

Austin King, chief mine inspector for the H. C. Frick Coke Co. at Connellsville, Penn., died on May 16. Mr. King had been talking to J. C. Munson when he fell to the ground unconscious and died before medical aid could reach him. Mr. King was one of the best known men in the coke region and had a wide circle of friends. He was 65 yr. of age and had been with the Frick people for 8 yr. He is survived by four daughters and five sons.

BOOKS RECEIVED

Clark Car Co., Pittsburgh, Penn. Catalog E9. "Extension Side Dump Cars." Illustrated, 12 pp., 4x9 in.

The A. & F. Brown Co., 79 Barclay St., New York. Catalog. "Power Transmission Machinery." Illustrated, 132 pp., 5x8 in.

The Goulds Mfg. Co., Seneca Falls, N. Y. Bulletin No. 102. "Single Acting Trunk Plunger Pumps." Illustrated, 16 pp., 8x10 in.

Stow Mfg. Co., Binghamton, N. Y. Booklet. "Portable Tools of Proven Value." Drills, grinders, etc. Illustrated, 20 pp., 3½x6 in.

May-Nelson Mfg. Co., 1202 F St., Washington, D. C. Bulletin No. 5. "Rotary High Vacuum Pump." Illustrated, 12 pp., 5½x8½ in.

Sullivan Machinery Co., 122 S. Michigan Ave., Chicago, Ill. Bulletin No. 70-C. "Sullivan DR-6 Mounted Water Hammer Drill." Illustrated, 16 pp., 6x9 in.

Ingersoll-Rand Co., 11 Broadway, New York. Form No. 3026. "Ingersoll-Rogler Class "PRE" Duplex Direct Connected Electrically Driven Air Compressors." Illustrated, 40 pp., 6x9 in. Form No. 3,312. "Imperial XB Duplex Power Driven Air Compressors." Illustrated, 20 pp., 6x9 in.

INDUSTRIAL NEWS

Youngstown, Ohio—The new byproduct coke plant, to be built by the Carnegie Steel Co., will consist of 210 ovens.

Wevaco, W. Ca.—The Cabin Creek Consolidated Coal Co. is building additional miners' houses to accommodate an increased working force.

Sharon, W. Va.—The Wyatt Coal Co. has begun the construction of a large double tipple at this place, where it has extensive developments under way.

Wilkes-Barre, Penn.—The Gama and Lykens veins of the Lehigh & Wilkes-Barre Coal Co. are to be connected by a long tunnel, according to plans just completed.

Beckley, W. Va.—The East Gulf Coal Co. will soon begin shipments from a mine on the new Stone Coal branch of the Virginian Ry., which is nearly completed to the scene of developments.

St. Paul, Minn.—The H. Koppers Co., of Pittsburgh, Penn., will build a coke and gas plant here costing $2,000,000. A contract to sell the gas, a byproduct, to the St. Paul Gas Light Co. has been closed.

Charleston, W. Va.—The Main Island Creek Coal Co. has recently awarded contracts for the erection of 100 miners' dwelling houses in the Main Island Creek district, where it is opening several mines and will shortly ask for bids on 50 more.

Bluefield, W. Va.—During the past month 2,852,072 tons of bituminous coal have been carried by the Norfolk & Western Ry., an increase of 134,565 tons over the month of March, and 652,121, or 29 per cent., more than the total of 2,200,551 carried in April, 1915.

Excelsior, W. Va.—The Excelsior-Pocahontas Coal Co. will have 11 American Mine Door Co. doors installed at the mines shortly. This company already has these doors installed at most of its mines; it is claimed they save the expense of the trapper.

Accoville, W. Va.—The three mines of the Avon Coal Co., on the Guyan Valley branch of the Chesapeake and Ohio Ry., have been purchased by W. E. Deegans, of Mt. Hope, and associates, who also own the Cub Fork Coal Co. and the Paragon Coal Co. operating in the same field.

Princeton, W. Va.—Official advices are to the effect that vessels are once more plentiful with the Virginian Ry., while its Sewalls Point dumpings are increasing every day. The company's loadings are reported good, and the road's tracks are being cleared for the east with great dispatch. Up to the present May shows a big increase over April shipments.

Harrisburg, Penn.—The Public Service Commission has postponed the hearing of the complaint of the Pittsburgh Coal Operators' Association against the Pennsylvania R.R. and other carriers, set for Pittsburgh on May 31, to Harrisburg, June 7. The complaint relates to freight charges to Philadelphia, Erie, York and Harrisburg.

Kansas City, Mo.—The Cameron Coal Co. was recently organized at Kansas City with a capital of $30,000, all of which has been paid in. The incorporators are J. S. Rowland, Thomas Bowen, and W. R. Green. The purpose of the organization is to deal in coal-bearing lands, operate coal mines and sell coal wholesale and retail.

Columbus, Ohio—The special conventions committee of the Michigan-Ohio-Indiana Coal Association met at Cedar Point, Ohio, last week to arrange for the annual meeting of the organization, which will be held at that place in August. The program, both for the business session and entertainment, will be announced in the near future.

Williamson, W. Va.—It is understood that the United Thacker Coal Co. has been making extensive surveys on its properties in Mingo and Logan Counties, W. Va., for the purpose of making leases thereon. The company has 50,000 to 60,000 acres which is claimed by experts to be a fine byproduct coal, rich in gas and low in sulphur and ash.

Chattanooga, Tenn.—The Continental Coal Corporation, which has its general offices at Chattanooga, has filed a petition in bankruptcy in the Federal Court of that city. It is similar to the petition recently filed at Louisville, the mines of the company being in Kentucky. Liabilities are nearly $3,000,000, while book assets are practically the same.

Boston, Mass.—The New Haven railroad has modified its limitations on the shipment of anthracite coal and is now ready to accept such freight to the extent of half the average daily receipts during May, 1915, from each of the rail lines connecting with its system. Shipments of bituminous coal over this road, however, will continue to be restricted as heretofore.

Greensburg, Penn.—The Cambria Steel Co., which is the owner of 2,500 acres of undeveloped coal lands in the northern part of Salem and Loyalhanna Townships plans to develop its holdings. The company recently purchased the John M. Sloan farm surface from Mrs. Sloan for $15,000. On this land the company engineers are at work making surveys for a large coal and coke plant to be built.

Pittsburgh, Penn.—Opposition has developed to the proposed plan of reorganization of the Pittsburgh Coal Co. The preferred stockholders through a committee state they are perfectly satisfied that the company can continue to pay 10 per cent. on the preferred stock without going through a reorganization, and they expect to appear in court to oppose any dissolution sale of the company's property.

Louisville, Ky.—The Louisville & Nashville R.R. has put a new train service into operation between Louisville and the Eastern Kentucky coal fields. This enables people to leave Louisville in the early morning and reach the points along the North Fork of the Kentucky River on the evening of the same day. This is a gain of from ten to twelve hours for travel as well as for mails over the former service.

Buffalo, N. Y.—The Lehigh Coal and Navigation Co., which lately severed its connection with the Skeele Coal Co. as sales agent, will now sell its coal direct and has established an office in the Prudential building, this city, with Samuel M. Stanley as Western sales agent. Mr. Stanley was for some years connected with the Buffalo office of Coxe Bros. & Co., going to Chicago shortly before the firm discontinued here.

Huntington, W. Va.—Towboats are active in handling the coal for both the Island Creek people and the Pittsburgh Coal Co., which is buying considerable of the Island Creek's coal. The coal from here is Guyan River coal and is taken to Cincinnati, Louisville and other western and southern points. The location of the branch of the Pittsburgh Coal Co. at this place is said to be only temporary, being experimental in nature.

Sunbury, Penn.—Record of the transfer of 2,607 acres of anthracite coal land by the Anthracite Coal Co., of Pittsburgh, to the Colonial Colliery Co., composed mostly of Philadelphia capitalists was made on May 18. The consideration is given as nominal, but according to the revenue paid $1,200,000 was the price. The property which includes the Natalie colliery and other operations is in Coal and Mt. Carmel Townships in Columbia County.

Pittston, Penn.—Both the Lehigh & Willkes-Barre and the Lehigh Valley Coal companies increased their rates on May 26. Under the new schedule of prices, 10c. a month will be added for June, July, August and September. The price of stove and chestnut coal is increased at once from $3.85 to $3.95, pea coal is reduced from $2.85 to $2.70 and egg from $3.85 to $3.70. In this manner the change on pea and egg will aggregate about 25c. and that on stove and nut about 50c.

Knoxville, Tenn.—E. C. Mahan, general manager of the sales department of the Southern Coal and Coke Co., Knoxville, announces that his company has closed contracts within the last 30 days aggregating 1,000,000 tons. One provides for steam coal for use at a Southern steel plant, another for a byproduct coke company in Ohio, the remainder for domestic consumption in all parts of the country. Mr. Mahan predicts that the next 12 months will be the greatest in the history of the southeastern Kentucky coal fields.

Gettysburg, Penn.—The Casselman River Smokeless Coal Co. was recently organized here with a capital of $200,000. The officers are William G. Barnheisel, of Hagerstown, Md., president, G. W. Crowe, Uniontown, Penn., vice-president, John H. Crowe, of Gettysburg, secretary and treasurer, E. F. Oswald, Gettysburg, general manager. The main office of the firm will be at Confluence, Penn. The company controls 3,000 acres of land in Somerset County and will open additional mines and build houses, stores, a railway, light and water plants.

Wellsburg, W. Va.—Many improvements are being made to the Gilchrist mine of the West Virginia-Pittsburgh Coal Co. Among those contemplated is the general revision of the arrangements for loading coal on barges. It is probable that a large conveyor will be installed to handle the coal without breakage, and at the same time be adaptable to the constantly varying stages of water. This apparatus will be designed to have a loading capacity of 1,000 tons daily. Slack will be loaded onto railroad cars while the larger grades of coal will be sent to river barges.

Columbus, Ohio—The deal for the opening of the 13 mines of the Continental Coal Co., located in the Hocking Valley district is progressing satisfactorily. George M. Jones, of the George M. Jones Coal Co., of Toledo, is heading the corporation, which will be known as the Continental Mining Co. The output will be marketed through the George M. Jones Coal Co. N. D. Monsarrat, who has been receiver for the property for several months, will not be connected with the operating company. He has been given authority to borrow $425,000 on receiver's certificates to put the property in good shape.

Wilkes-Barre, Penn.—Luzerne County's valuation has been boosted $25,101,259 this year over that of 1915 according to figures given out by the county assessors. This increase is made on both coal and surface, though principally upon the former. This year's valuation is $330,751,060. Most of the municipalities of the county show a substantial increase, though some have a lower assessment this year. Hanover township shows the greatest increase, $6,048,498. The Lehigh & Wilkes-Barre Coal Co. and the Delaware, Lackawanna & Western Railroad Co. own practically all the coal in this township.

Gallipolis, Ohio—The Public Utilities Commission of Ohio has rendered a most important ruling affecting shipping interests on railway tracks from Gallipolis to Pomeroy, and used in common by the Kanawha and Michigan and the Hocking Valley R.R. The ruling compels the Kanawha and Michigan to furnish cars and haul the coal for the Hocking Domestic Coal Co., owner of the Red Bird mine near Gallipolis. The coal company brought the case through former attorney general of Ohio, Wade H. Ellis. The company has heretofore been able to ship coal only on the Hocking Valley.

Harrisburg, Penn.—Returns from the primary election show for Schuylkill County that Hughes Evans and W. H. Wilson have been nominated by the Republican party for mine inspectors, defeating M. J. Brennan and Keran Donahue, both of Pottsville. Brennan has been a mine inspector for 20 years and Donahue has been an inspector for about 8 months. Brennan and Donahue have been nominated by the Democrats, so if Evans and Wilson should receive certificates from the Mine Inspectors' Board, having taken the examination on May 18 and 19, Schuylkill County will witness the first contest at the polls for mine inspector for a number of years.

St. Louis, Mo.—An effort is being made to revive the inner group selling organization which was formed last fall, with the Kolb Coal Co. as the St. Louis selling agency, but which practically disintegrated during the latter part of the winter, when the trying trade conditions prompted some of the operators to break away and there was as a result more or less price slashing. A meeting was held a few days ago at the offices of the St. Louis Coal Co. and the situation was discussed but no definite action was taken. Conditions in the inner group are bad, largely owing to the advantage possessed by the companies connected with the "short lines," coal roads, which enables them to get whatever business they go after. The result is that the prevailing prices are below the mine-run cost.

Pittston, Penn.—The Lehigh Valley, the Pennsylvania and the Hillside Coal and Iron companies have made announcements showing the application of the new agreement of the stationary engineers, which has been a question for much speculation in the anthracite field. It had been the practice of some companies to pay a higher rate to the engineers on the two busy shifts than to the men working from 9 p.m. to 5 a.m. The new agreement results in all engineers being paid the same rate. This was made apparent when the engineers received their extra earnings for April under the new agreement. The higher paid engineers received only about $3, representing three per cent. advance, while the lower-rate men received nearly $25, being elevated to the same scale as the high-rate men. At some of the operations here there is no engineer on duty from 9 p.m. to 5 a.m.

Columbus, Ohio—The permanent organization of the Southern Ohio Coal Exchange was effected at a meeting held in Columbus last week, after a number of conferences extending over 60 days. Walter D. McKinney, who has been prominent in railway and statistical work in Columbus, was selected commissioner. He will have headquarters in Room 507, Outlook Building, where the Hocking Valley Coal Operators' Association was formerly located. Other officers were: U. S. Morris, president of the Superior Colliery Co., chairman of the executive committee; George H. Barker, Maynard Coal Co., member committee representing Pomeroy Bend district; T. R. Biddle, Boston-Consolidated Coal Co., Athens, representing Hocking Valley, and W. L. Timmons, Zanesville Coal Co., representing Crooksville district. Mr. Morris represents the Jackson field. Work in collecting data on cost of production will be started in the near future. A plan to consolidate with the Coal Operators' Compensation and Labor Bureau, of which J. M. Roan is commissioner, has been abandoned.

Seattle, Wash.—Alaska anthracite from the Bering River coal fields will be placed on the markets of Alaska and the Pacific Coast this fall. Final arrangements to build the necessary railroad from tidewater to the coal have been made and the full amount of the capital subscribed. The line will cost about $300,000 and will be 17 mi. long. The project is being backed by John and James A. Campbell, two of the largest logging operators in the Puget Sound country. The contract for the line has been let to George W. Nelson. One terminal of the road will be 2 mi. from the mouth of the Bering River and the other at the coal mines of the Alaska Petroleum and Coal Co. The company already has on the ground 2 mi. of steel, 16 flat cars and a locomotive, 300,000 ft. of timber, 7 mi. of ties and has started a crew of 200 on the grading operations. The company plans the construction of a large coal bunker at the water terminal, where the coal will be loaded into sea-going vessels for distribution. It is expected that the first 2,000 tons will be delivered in Seattle in October.

According to announcements of Governor Strong of Alaska Tacoma capitalists headed by Henry Hewitt have organized the Alaska Anthracite Railroad Co. of Katalla, Alaska, and also propose the contracting of a road from Comptroller Bay into the same fields. Operations on their mines have started.

Market Department

General Review

Consumers hesitating to accept the new advanced anthracite circulars. Bituminous quiet but steady. Lake business expanding but labor disturbances are becoming more threatening. Steady demand for steam grades in the Middle West but domestic sizes in over supply.

Anthracite—As a result of an extensive publicity campaign most consumers are meeting the increased circulars on hard coal without any serious objection, though quite a number are holding off and are making the customary threat of adopting bituminous coal. There seems to be little reasonable doubt but that the increases are justified, although it is noted that some of the individuals are already shading the new circulars, as was anticipated. The meagre demand for storage coal, now that definite prices are out has been a distinct disappointment to the trade; the tendency to hold off is undoubtedly due in part to anticipation of some relief as a result of governmental investigation, but judging from past experience there is little to be expected from this source. The delay in the change of sizes is ascribed to a desire to await the decision of the Dauphin County Court on the matter of new freight rates. Low temperatures have had a stimulating effect on retail trade, though this has not extended to the wholesale end to any appreciable extent. Modification of embargoes to down East points has resulted in a more liberal supply moving in that direction and shipments are also somewhat freer in the Lake trade.

Bituminous—The market continues relatively quiet but with a well defined air of expectancy. The situation is rather mixed and it is clear that a good many industrial concerns still have substantial supplies in reserve. The prompt market is generally dull, but there is a large movement on contracts. There have been some moderate recessions at certain points which has encouraged buyers to hold off, and there are some shippers who have rather large accumulations; many of those who were thought to be permanently out of the market are once more canvassing actively for business. On new contracts operators continue firm in their position for higher prices, particularly since the scarcity of labor has placed the question of adequate supplies in some doubt. The scarcity of miners is already making it difficult to fill orders promptly in some instances, while labor difficulties and misunderstandings with the unions, are also seriously interrupting the production at other points.

Lake Trade—The persistent labor troubles in the Pennsylvania district continue the predominating feature in the Lake market. Temporary shortages from this cause have resulted in a few sales at fancy prices but no serious difficulty is anticipated in keeping adequate supplies, as most consumers still have surplus stock that has not yet been worked off, while the wage difficulties in Ohio are now adjusted and production on the increase. Prices on new contracts are ruling very firm at satisfactory increases over last year's figures. The movement to the Lake ports continues to increase though still subject to delays occasioned by the scarcity of both cars and vessel tonnage. Every effort is being made to get as much coal on board vessels as possible and this is a considerable factor in relieving the general market of any surpluses.

Middle Western—Mine operations are on about a half-time basis with the demand centering entirely on the steam coals, the difficulty in moving the domestic grades being the chief source of worry at this time. One favorable factor in the situation is the much restricted volume of consignment coal coming in. The reserve stocks accumulated in anticipation of a suspension on Apr. 1 are also being cleaned up, though many of the railroads still have large supplies. The unusually cool and unseasonable weather has resulted in a very heavy consumption of the domestic sizes, most consumers of this grade now being clean of supplies. The current business is relatively quiet but sales agents are very busily engaged in negotiations over new contracts, a great many of which still remain to be concluded.

A Year Ago—Anthracite reported on demurrage and a dull season is anticipated. Heavy export demand for bituminous stimulates interest among local consumers. Lake movement increasing.

Business Opinions

Boston News Bureau—It is anything but easy to size up the general situation today. Opinions differ radically as to the future. There is apparently an increased disposition to discount the termination of the war, although there is no assurance that this is anywhere in sight. But if it is, what? It will require a long time to satisfy the different claims that will then appear. In the meantime the world will have to live and Europe will not be in a position to compete at once with this country. It will require much time to bring labor up to normal abroad. In this country, things will be different. We shall be stronger in every way. The past two years have taught us much. We are better prepared to meet competition than ever before. We are financially, mentally and physically stronger, while Europe is the reverse. General trade is probably better today than it has been since 1907. Much of the improvement is due to our export business.

Iron Age—In the general tendency of the domestic market to less activity, the heavy demand for war steel and for plates becomes highly interesting. The Steel Corporation has taken on the largest single contract for shell forgings yet let by the British Government, from 200,000 to 250,000 tons being involved. Adding about 100,000 tons for gun forgings closed by a Shenango Valley company and a like amount placed two weeks ago in eastern Pennsylvania puts the total above 400,000 tons. Present inquiries on behalf of the Allies represent nearly 200,000 tons more.

Marshall Field & Co.—Wholesale distribution of dry goods for the week has been in larger volume than for the same period last year. Road sales for fall delivery have been normal, but are much greater for immediate delivery than in the corresponding week a year ago. Merchants have been in the market in considerably larger numbers and report that cool spring weather is retarding somewhat retail distribution. Collections are normal.

Dun—With sustained activity assured by previous unprecedented buying, the recent abatement of new business in some lines is regarded with equanimity. More definite signs appear of a slackening of orders in steel and iron, in textiles, and in footwear and leather, but the recession is comparatively slight and there is prospect that renewed demand may cause further expansion. The lessening of the strain in the leading industries comes at a time when production, owing to strikes and the shortage of labor and materials, is being maintained with difficulty and, as outputs fall short of requirements, the change is not unwelcome. Factories have been crowded beyond capacity and they will now be in a position to accept new business.

Dry Goods Economist—Fall buying of piece goods by jobbers and large retailers has been concluded, so far as initial purchases are concerned. The beginnings of fall business in some of the other lines are now becoming apparent. Current business in all lines has been checked by the cold weather which has prevailed over the upper tier of states, from the Rockies to the Atlantic and in some of the Southern sections.

Bradstreet—Activity is still the dominant feature in practically all commercial and industrial channels, and the phrase "sold ahead" typifies conditions that buttress most lines of enterprise. Yet it is probable that in the current week new business has receded somewhat by contrast with the preceding superabundant activity, and it is evident that while buyers of essential staples are still concerned about probable future supplies, they are purchasing more slowly, first to guard against loading up too heavily with stocks, and secondly they are hoping that prices will recede. This streak of conservatism, running, as it does, like a thin line through an otherwise exceptionally active situation, is also due to growing discussions regarding prices having reached zenith point.

American Wool and Cotton Reporter—Big single sales of territories have taken place in the wool market but outside of this it has been quiet with a firm undertone. The market is as strong as ever and is likely to be more so. Very few East India wools are in the market. A sale of 220 bags of spot Kandahars and Vickerners was made at private terms. High values are ruling in the West. The stage is set for a good boom, according to one Boston dealer.

ATLANTIC SEABOARD

BOSTON

Very quiet market with prices gradually sagging. Buyers get some encouragement to wait. Georges Creek and Pennsylvania grades in ample supply at all points. Anthracite in good demand.

Bituminous—The bituminous trade generally is dull. The Pocahontas and New River shippers are all suffering from heavy accumulations and the recent bids on the Navy contract are an indication of the state of prices. The less-known grades are selling down to $2.70 f.o.b. Hampton Roads to transient buyers, but marine transportation continues scarce, particularly for New England. Off-shore tonnage has lately been arriving more regularly.

Some recession in on-car prices at Boston and Providence has encouraged buyers to hold off. There is a growing feeling, however, that marine freights are likely to be high throughout the year and that coal in this territory will therefore be hard to get during the fall and winter. The railroads are expected to make intermittent embargoes for several months to come and the outlook is not at all promising for large sections of New England that ordinarily rely on all-rail delivery.

The shippers of Georges Creek continue to have ample quantities available at all the loading piers except at Baltimore. While there is congestion there on West Virginia coals the movement of Georges Creek is still somewhat less than normal. The output is being confined to contract business, but doubtless there will be plenty of this coal to be sold on the open market during the next month or two.

Pennsylvania steam coals are also in plentiful supply. Shippers of the best grades from Cambria who considered they were permanently out of the market on anything like present figures are again canvassing for business and prices are easier by another 10c. Shipments to tidewater are irregular in volume through the shortage of boats and the embargoes against shippers who have not moved coal already accumulated at the piers. On the other hand, public institutions now coming into the market for yearly contracts, especially those for all-rail delivery, are likely to find coal factors rather unresponsive. Such buyers have insisted on prices f.o.b. the point where the fuel is used and orders of that kind are not attractive this year. High volatiles for railroad fuel have lately sold down to $1.20@1.25 f.o.b. mines in Indiana and Clearfield counties.

Anthracite—While tidewater prices seem to be well established as announced a fortnight ago there is still some divergence in prices f.o.b. the mines. A number of individual shippers of hard coal have not yet issued any prices and there is some confusion in this market especially on quotations for the junior sizes.

Domestic sizes are in active request. Dealers along the New England coast are particularly insistent on May shipments and the demand promises to be consistent, at least through July. Most distributors in this territory are far behind on their usual spring quota. Retail demand is excellent. The public seems impressed with the argument that anthracite may again be hard to get next winter.

The trouble with dock hands at Philadelphia is gradually clearing up.

Bituminous at wholesale, f.o.b. loading ports at the points designated is quoted about as follows:

	Philadelphia	New York	Baltimore	F.o.b. Mine
Clearfields	$2.40@2.85	$2.70@3.15	.....	$1.15@1.60
Cambrias and Somersets	2.65@3.00	2.95@3.30	.....	1.40@1.75
Georges Creek (contract)	3.07@3.17	3.37@3.47	$3.00@3.10	$2.00@2.10

Pocahontas and New River are $2.75@2.80, f.o.b. Norfolk and Newport News, Va., and $4.90@5.10 on cars at Providence and Boston.

NEW YORK

The demand for anthracite is slow. Buyers hesitate while waiting for new prices. The bituminous market is dull—no call for coal. There is much demurrage on coal on hand.

Anthracite—The anthracite coal market here is unsettled. Pending the announcement by companies other than the Philadelphia & Reading Coal and Iron Co. of the new price list dealers hesitate before buying and little coal is moved. Low temperatures for this season had a stimulating effect on conditions however and retailers stocks were depleted. This demand, however, did not reach the wholesale end. More coal is being sent into New England owing to a modification of the stringent embargo orders, by which 50 per cent. of the average daily receipts from each connecting line during May of last year can now be accepted.

Shippers were "up in the air" regarding the steam-coal proposition. Early this week no official announcement had come from the companies regarding prices on the small coals and much interest was being taken as to the attitude of dealers who generally bid on city contracts. Bids were opened May 26 for 13,680 tons of Buckwheat No. 1; 300 tons of rice and 6,510 tons of barley coal. There are those who believe that the proposed "boiler" coal will not meet with instant favor.

Current quotations per gross ton f.o.b. tidewater at the lower ports are as follows:

	Circular	Individual		Circular	Individual
Broken	$4.95	.....	Pea	$3.50	$3.40@3.50
Egg	5.05	$4.95@5.05	Buck	2.75	2.65@2.75
Stove	5.30	5.20@5.30	Rice	2.25	2.20@2.25
Nut	5.35	5.25@5.35	Barley	1.75	1.70@1.75

Quotations at the upper ports are generally 5c. higher on account of the difference in water freight rates.

Bituminous—While some shippers of bituminous coal complain of poor business others claim to have had a busy week. There is little demand however for spot coals, but contract fuels are moving freely and with little delay. Most consumers are well stocked and demand is dull. Embargoes remain tight and several individual shippers are closed down entirely at some of the New York harbor docks. There is considerable demurrage coal in the local harbor and low prices are quoted to permit its being moved.

In the central Pennsylvania field production is curtailed by labor troubles and a shortage of labor is reported from all sections.

Operators continue to hesitate about closing new contracts and will consider them only when it is possible to obtain higher than early spring prices. The labor situation is the principal reason for refusing to take on additional tonnage.

Current quotations per gross ton f.o.b. tidewater for various grades follow:

	South Amboy	Port Reading	St. George	Mine Price
Georges Creek Big Vein	$3.50@3.60	$3.50@3.60	$3.50@3.60	$1.95@2.05
Georges Creek Tyson	3.10@3.25	3.10@3.25	3.10@3.25	1.60@1.80
Clearfield: Medium	3.00@3.10	3.00@3.10	.....	1.45@1.55
South Forks	3.25@3.50	.....	.....	1.70@1.95
Nanty Glo	3.00@3.20	.....	.....	1.55@1.65
Somerset County: Medium	2.90@3.00	2.90@3.00	2.90@3.00	1.35@1.45
Quemahoning	.....	3.00@3.10	3.00@3.10	1.45@1.55
West Virginia Fairmont ¾	.....	2.80@2.90	2.80@2.90	1.00@1.10
Fairmont mine run	.....	2.70@2.80	2.70@2.80	.90@1.00
Western Maryland	.....	2.55@2.65	2.55@2.65	1.10@1.20

PHILADELPHIA

Anthracite inactive, with few orders placed. Contract activity. Retail men to place business on cash basis. Some shading of prices by individuals. No change in bituminous.

Anthracite—The most satisfactory feature of the present market is that the period of uncertainty has passed. However, if the operators expected any great rush of orders they must be sorely disappointed, as the dilatory methods pursued in fixing a price circular has unsettled and actually disgusted the trade to such an extent that some dealers, with yards filled to capacity, have temporarily lost interest in their business. This may partly be due to the attitude of the consuming public which shows no inclination to store the usual tonnage at the rates announced by the dealers.

The retail prices as extensively advertised in the daily press by the largest and best dealers are: Egg, $7.25; stove, $7.50; chestnut, $7.75 and pea, $5.50, for May delivery. To these figures will be added a monthly advance of 10c. a ton up to and including October. There is also announced that there will be a charge of 25c. per ton where any extra hauling is necessary, that is, where the coal cannot be chuted directly into the customers' coal bins. This is somewhat of an innovation in this city, although it has been practiced to a limited extent by some dealers, but the general practice has been a flat price for all kinds of deliveries.

While the salesmen are not receiving many orders for current business with the retailers, the announcement of the contract prices has served to keep them busy in bringing this trade into line. In many instances the customers are paying the increased prices without question, as the extended exploitation of the increase in the newspapers has paved the way. However, there are many others who have balked and give the usual threat of changing over to soft coal.

As predicted the individuals are already known to be shading prices. Reports have been received from reliable sources that they have offered buckwheat coal in single car lots at the price of $1.50, the contract figure, as compared with $1.65, the circular prices, and several instances have been heard of where they are willing to contract on buckwheat coal at $1.30. While there have been few offers of the prepared sizes at less than circular in this city, the same cannot be said of the outside territory and up the state, where egg has been offered at $4.65, stove, $3.90; chestnut, $4 and pea, $2.30.

Pea size is really expected to furnish a lot of difficulty all summer and it is almost certain that the production cannot be disposed of in the market at a monthly advance in price, starting at $2.40. The cutting of the price will continue and there will be thousands of tons stored, if the mines are able to work. When the market last summer would not take the production at the off price of $2.05, what chance is there with an advance of from 50c. to 75c.? The dealers appear perfectly confident that the circular rates will not hold on this size during July and August and are in no hurry to buy.

The prices per gross ton f.o.b. cars at mines for line shipment and f.o.b. Port Richmond for tide are as follows:

	Mines	Port Richmond		Mines	Port Richmond
Broken	$3.60	$4.75	Chestnut	$4.10	$5.15
Egg	3.75	4.85	Pea	2.40	3.20
Stove	4.00	5.10	Buckwheat	1.65	2.55

Bituminous—The bituminous trade continues to move along quietly, with, however, an air of expectancy. New orders are difficult to get, yet those that are on the books are not being cleared as promptly as would be desired because of the scarcity of labor. Many companies are reporting that they have only from 25 per cent. to 40 per cent. of the number of men required to operate full. Especially has this become noticeable since shipments have started toward the Lakes. A careful canvass of the manufacturing plants in this district discloses that most of them still have good stocks on hand; in some instances as much as four or five months' supply having been provided for. Local deliveries by the railroads continue good, but the situation to the north and east shows no improvement. Consumers still continue to disregard the signs of an imminent scarcity.

The prices current at this time per gross ton f.o.b. cars at mines are as follows:

Georges Creek Big Vein	$1.90@2.00	Fairmont gas, ¾	$1.50@1.60
South Fork Miller Vein	1.70@1.80	Fairmont gas, mine-run	1.35@1.45
Clearfield (ordinary)	1.35@1.45	Fairmont gas, slack	.95@1.00
Somerset (ordinary)	1.30@1.40	Fairmont lump, ordinary	1.15@1.25
West Va. Freeport	1.15@1.25	Fairmont mine-run	.95@1.05
		Fairmont slack	.90@1.00

BALTIMORE

Anthracite business improves but slowly. Bituminous trade a little more brisk. Labor shortage acute. Exports but medium.

Anthracite—There has not been the improvement in anthracite demand that some dealers had hoped for. The increases in the schedule over last spring seem to make consumers hesitate to buy at once. One reason for delay in purchasing for storing in bins for future use is that the Baltimore Retail Coal Exchange has decided to allow the May rate, the lowest for the season, to continue through the month of June.

Bituminous—An increased inquiry is noted in the bituminous trade. Prices are a little stiffer for immediate delivery. Contract rates remain about constant. Labor shortage is growing more and more pronounced.

Prices to the trade at the mines were about as follows: Georges Creek Tyson, $1.75; Miller vein, $1.55; Quemahoning, $1.60; Somerset, $1.50; Freeport, $1.20; Fairmont gas, three-quarter, $1.05; same, run-mine, $1; slack, 95c.

HAMPTON ROADS

Dumpings for week heavy; both Chesapeake & Ohio and Virginian railroads expect heavy tonnage for the month of May.

Shipments from Hampton Roads for the week have been heavy. Foreign steamers have arrived in large numbers for both cargoes and bunkers and in consequence with a good coastwise movement the dumpings over all piers have shown up well. Cargoes for export went to Buenos Aires, Genoa, Marseilles, Rio, La Plata, Barbados, St. Georges, Taltal, Santo Domingo, Bagnoli, Pernambuco, Para, Mamaos Ponce and Havana. Shipments of coke have been small, although one or two parcels were shipped out.

The heavy movement of the week has somewhat cut down the accumulation of coal on the railroad yards but with the large amount arriving daily vessels have suffered little if any delay waiting for coal to arrive.

Inquiries are constantly in the market for large parcels, from 100,000 tons to one or two millions, but so far as can be learned no extra large contracts have been closed during the week on export business.

Railroad Tonnages—Dumpings over the local piers for the past five weeks compare as follows:

Railroad	Week Ending Apr. 22	Apr. 29	May 6	May 13	May 20
Norfolk & Western	140,327	169,430	159,875	110,696	181,338
Chesapeake & Ohio	95,838	94,525	110,108	95,974	104,703
Virginian	59,157	57,675	58,846	95,198	95,799
Totals	295,322	321,630	328,829	301,868	381,840

Ocean Charters and Freights

VESSEL CLEARANCES

The following steamers have cleared from various ports:

NORFOLK

Vessel	Destination	Tons
Nordfarer	Rio Janeiro	5,107
Hilston	La Plata	3,159
Francesco[12]	Genoa	4,000
Torjenskjold[13]	Barbados	5,500
Joel Cook[8]	St. Georges	594
Polaria[5]	Taltal	4,650
Accame	Genoa	6,365
H. de Paynes	San Domingo	549
Umbria	Bagnoli	2,294
Marion Cobb[5]	Ponce	602
Achilles[8]	Canal Zone	12,000
Mercury[12]	Pernambuco	2,114
Chiswick[4]	Havana	4,833
M. Manson	Para	2,402
Stephen[7]	Para	1734

NEWPORT NEWS

Nolisment[14]	Genoa	7,451
Oak Branch	Marseilles	4,150
Nereus[14]		5,000
Vitalia[4]		1,500*
Jerseymoor[4]	Buenos Aires	5,850

BALTIMORE

Vessel	Destination	Tons
Clinchfield	Cuba	2,152
Fishpool	Argentina	6,209
Colding	Honduras	2,094
Jata Mendi	Italy	6,404

PHILADELPHIA

Osten	Santos	1,288
Masapequa	San Juan	
Rodfaxe	Santiago	
Adriatic	Nova Scotia	
Santurce[4]	Guayanilla	
Doris	Savona	
Victor C. Records	Jucaro	263
Margaret M. Ford	Aguadilla, P. R.	291
Powell	San Juan, P. R.	
Hermod	Fort de France	
Jose	Santa Marta	
Kinmount	St. John's	1,598
Mary Manson	Ponce	599

* And 79 tons of coke.

[1] Atwater & Co. [2] Baker Whiteley [3] Barber & Co. [4] Berwind-White [5] C. G. Blake Co. [6] Castner, Curran & Bullitt [7] Chesapeake & Ohio C. & C. Co. [8] Crozer-Pocahontas Co. [9] Hasler Brothers [10] Flat Top Fuel Co. [11] New River Coal Co. [12] Pocahontas Fuel Co. [13] Smokeless Fuel Co. [14] C. H. Sprague & Son [15] Maryland C. & C. Co [16] White Oak Coal Co.

OCEAN CHARTERS

Coal freight charters have been reported as follows:

PHILADELPHIA

Vessel	Destination	Tons	Rate
Maxwell, Jr.	Jucaro		$8.00[1]
Osten	Santos	1,288	19.50[2]
Kinmount	St. John	1,598	[3]
Thelma	Vita		7.00[2]
Bluefields	Jucara		7.00
A. J. Trainer	St. John		3.25

VIRGINIA

Arborean	W. C. So. Am.	3,600[4]	$15.00
Rosina	R. Plata		20.40
Novo	R. Plata		17.00
E. Wolden	R. Plata		17.00

VIRGINIA—Continued

Vessel	Destination	Tons	Rate
M. L. Baxter	Bahia		$18.00

BALTIMORE

Loveland	Cuba	1,463	
Oak Branch	Callao	2,875	
Lundy	Rosario	1,779	$21.60
Clinchfield	Cuba	1,146	
Jata Mendi	W. C. Italy	2,743	30.60
N. S. Assunta	Italy	1,900	[3]

[1] Port charges. [2] Prompt. [3] Coke. [4] June.

OCEAN FREIGHTS

Since our last report a number of steamers were chartered for export coal at rates recently quoted, and we consider the market firmer than a week ago, with less tonnage offering.

We would quote freight rates on coal by steamer as follows:

To	Rate	To	Rate
Havana	$4.50@5.00	Bermuda	$5.00@6.00
Cardenas or Sagua	6.25 about	Vera Cruz	6.25 about
Cienfuegos	6.00@6.50	Tampico	6.25 about
Port au Spain, Trinidad	7.00 about	Rio Janeiro	[4]19.50 about
St. Lucia	7.00 about	Santos*	[4]20.00 about
St. Thomas	6.50@6.75	Montevideo	20.40@21.60
Barbados	7.00 about	BuenosAires orLaPlata	20.40@21.60
Kingston	6.75@7.00	Rosario	21.60@22.80
Curacao	[3]6.25@6.50	West Coast of Italy	33.60 about
Santiago	6.50@7.00	Barcelona**	30.00 about
Guantanamo	6.50@7.00	Chile (good port)	[4]15.50@16.00
Demerara		Marseilles	32.40 about

* Consignees paying dockage dues. ** Spanish dues for account of cargo.

[1] 500 tons discharge. [2] 400 tons discharge. [3] And p.c. [4] Net, 1,000 tons discharge. [5] Or other good Spanish port.

W. W. Battie & Co.'s Coal Trade Freight Report.

COASTWISE FREIGHTS

The few charters made this week show an easing off in rates from Hampton Roads to Boston, due more to light demand than to any increase in supply; $2.25 is now the high figure, while 2,500-ton barges have accepted $2.15. Most of the charters continue to be recharters by coal factors who have found a duller coal market than anticipated.

Barge freights on Long Island Sound, New York to Providence and similar points, are 80@90c. Some shippers are holding off in the expectation of lower rates.

Small vessels, 200 to 475 tons, closed lately at $2 from New York to eastern Maine points like Mount Desert.

It is rumored the Coastwise Transportation Co. has chartered the steamer "Suffolk," 7,300 tons, at $40,000 per month for a 5-year period to Messrs. Levino & Co., of Philadelphia.

Mobile, Ala.—Vessel charters has been exceptionally light for the past thirty days. Three cargoes of coal have cleared from Mobile, four from Galveston, one from Houston, two from New Orleans and five from Pensacola.

LAKE MARKETS

PITTSBURGH

More strikes on account of wage scale complications. Market a shade stiffer.

Last week a fresh batch of strikes started in the Pittsburgh district. Several mines, operated by the leading interests, were closed, and the trouble spread to other mines in the Monongahela Valley. The strikes are attributed to divergences of opinion as to interpreting the wage scale, but the practical suggestion is made that many men struck simply because they had drawn a much larger pay than they had hitherto been receiving.

The strikes have been seized by sellers as an argument for higher prices, and some decidedly fancy prices have been mentioned as prevailing or likely to prevail. The suggestion has even been offered that some coal shipped to Lake Erie docks for the Lake trade may have to be reconsigned to consumers. It seems rather improbable that any real scarcity of coal will be developed, particularly in view of the fact that accumulations in consumers' hands are not altogether worked off yet, but the operators are certainly showing a keenness in endeavoring to advance prices.

Slack has been saved from further decline, while we quote mine-run and screened coal 5c. higher, all as follows: Slack, 95c@$1.05; mine-run, $1.30@1.40; ¾-in., $1.40@1.50; 1¼-in., $1.50@1.60, per net ton at mine, Pittsburgh district. The circular price on mine-run is $1.50.

BUFFALO

Bituminous not very steady. Cars plentier than miners. Not much coal on track. Prices fairly strong. Anthracite prices not all in yet.

Bituminous—The demand is not heavy in the single-order trade, though contracted coal is moving at a good rate. Consumers are pretty well supplied and seem to think there is no danger of higher prices. The actual consumption is good, though some doubt is now expressed as to the continuation of the rush in the iron trade. If that slackens it will soon weaken coal prices.

Standing cars of coal have not been numerous for some time. In some trades the roads will not take shipments unless assured by the consignee that he can unload his freight promptly. The demurrage charge is not sufficient to assure the unloading. Cars move at irregular rates and so make much of the trouble the roads seek to avoid.

There is still much difficulty with the miners all through the bituminous districts. They do not like the wage scale and are ready to make trouble. There is no concerted strike, but this mine or that is always in trouble because the men refuse to work for some reason, imaginary misunderstandings being the cause. It looks as if the summer would go much in that way. Still there is coal enough mined to satisfy the demand and there are cars enough to handle it. In spite of the many annoyances there is money in the business.

Prices are fairly strong and promise to continue, as follows:

	Pittsburgh	Allegheny Valley	Penn Smokeless
Lump	$2.95	$2.75	$2.80
Three-quarter	2.85	2.60	.....
Mine run	2.75	2.50	2.60
Slack	2.40	2.30	2.60

Prices are per net ton, except east of Rochester and Kingston, Ont., where they are per gross ton.

Anthracite—There is not much life to the anthracite trade. The supply coming in this direction is more liberal, but it is not as large as the shipping agents would like to see it, for Lake tonnage is plenty and now is the time to move the coal to Upper-Lake territory. The May prices are arriving slowly, some offices not getting any orders till a week or more after others were out. It appears to be too late now for a spring trade of any size. The consumers have been obliged to burn much more than the average amount on account of the unseasonable weather, but beyond that they are indifferent to the trade.

Vessels stand out for more than the shippers will pay, so single-cargo rates are made. Prices are as follows according to the May schedule, with 40c. reduction for actual May delivery:

Grate	$5.85	Chestnut	$6.35
Stove	6.10	Pea	5.00
Egg	6.10	Buckwheat	3.50

The lower grades, below chestnut, are not generally quoted yet, as they are in doubt. An additional charge of 25c. a gross ton is made for putting coal on vessels.

COLUMBUS

More activity was shown in steam grades in Ohio territory during the past week. Lake trade is also active while domestic business is quiet.

Generally speaking the market for coal in Columbus and central Ohio territory is good. This is true of steam sizes especially, while the domestic trade is dull, as usual for the time of the year. The volume of business is fairly large and the tone of the trade is satisfactory. Operators as well as jobbers believe the prospects for the future are bright.

Buying for steam purposes is one of the best features. Manufacturing plants have used a large part of the surplus accumulated and are now buying on the open market.

Lake business is good all along the line. The docks of the Hocking Valley at Toledo have been busy, loading 117,000 tons during the week ending May 19. The shortage of cars, especially on West Virginia roads is having its effect on the Lake trade. Some roads are only able to supply from 50 to 60 per cent. of cars required.

With the mining scale settled in almost every mining district of the state production is increasing. Crooksville and eastern Ohio are the only important districts which have not settled working conditions. Mining is being carried on in eastern Ohio. Steps are being taken to open more mines in the Hocking Valley district and the tonnage will be doubled in the near future.

Prices are about as follows:

	Hocking	Pomeroy	East Ohio		Hocking	Pomeroy	East Ohio
Re-screened lump	$1.60	$1.70	.....	Egg	$1.30	$1.35	....
Inch and a quarter	1.50	1.50	$1.40	Mine-run	1.20	1.20	$1.15
Three-quarter-inch	1.40	1.40	1.30	Nut, pea and slack	.90	.90	.85
Nut	1.30	1.30	.....	Coarse slack	.80	.80	.75

DETROIT

Buying of steam coal centers mainly in small sizes. Retail dealers do some business in domestic stock. Anthracite holds winter price. Lake shippers find few boats go to Lake Michigan.

Bituminous—Steam coal users seem backward about giving orders and display a tendency to wait until convinced that an opportunity to buy cheap coal will not develop in time to enable them to meet their requirements. While nut and slack seem to sell readily, the buying of other sizes is not satisfying to wholesalers or jobbers. The situation generally is suggestive of an uncertain market.

Curtailment of mine production by labor difficulties in some districts, because of lack of labor in others and the efforts being made to get as much coal as possible aboard boats for transportation up the Lakes, is just now preventing Detroit from being overburdened with consignment coal. The amount of such stock on hand is large, however, and the coarser coal is quite often sold below mine prices.

Lake Trade—The movement of coal to loading docks is so slow that some of the shippers have been unable to promptly load boats under contract. While a large amount of coal is being moved to Lake Superior ports, shippers have much difficulty obtaining vessel capacity to deliver coal on Lake Michigan docks. Vessels of small size, which are now few, are in active demand. A rate of 50c. a ton, offered on shipments to Portage, late last week failed to bring contracts.

CINCINNATI

A duller market has been in evidence, demand falling off somewhat, although no weakness is seen. Contracting is about over. Car supply continues poor.

Indications of softness were seen in the local market during the past week, due for the most part to somewhat slower demand than has been the case hitherto. Prices remain firm, however, the continued difficulty in getting an adequate supply of cars, and the scarcity of labor as well, serving to hold up quotations in spite of the slight falling off in demand for fuel.

Better conditions with reference to the Lake movement are also reported, and coal is going to the various ports in considerable volume, although there is still some difficulty in getting boats.

LOUISVILLE

Eastern Kentucky market showing strength and summer movement begins. Buying will be much earlier this season. Strike under way in western Kentucky.

Prices continue on the May basis in the eastern Kentucky field although the volume of the movement is increasing and operators expect that the buying which has been begun by retailers will be hurried up and completed early. Some mines are reported well sold up. Some indications of a renewed car shortage are causing apprehension. The strike in the western Kentucky field is on in an orderly way and operations are being watched to keep them in shape. Business has been slow in the western field and the market has felt little effect from the strike as yet.

COKE

CONNELLSVILLE

Restriction of coke output not much in evidence. Market very dull with prices not quotably changed.

Not much has come thus far from the efforts of certain merchant coke producers to lead in a general curtailment, as production has increased since the first of the month when observance by the men of the Easter holidays was curtailing production and the curtailment was not felt uncomfortably by the furnaces. The belief is renewed that rather strongly competitive conditions are likely to continue to obtain in the trade, and possibly the most likely influence to advance prices would be that of there being a demand for raw coal. The renewal of strikes in the Pittsburgh coal district is pointed to as suggesting that there may be such a demand and the coke market is possibly a shade stiffer on this account than would otherwise be the case.

There is practically no inquiry for furnace coke for second half shipment, while the inquiry for spot furnace coke continues light. Shipments on existing contracts are evidently entirely adequate, and the majority of the contracts now in force run through the second half of the year. The foundry coke market continues fairly easy, demand being hardly up to expectations. We quote prices unchanged as follows: Spot furnace, $2.25@2.40; contract, nominal, $2.50@3; spot foundry, $3.50@3.75; contract, $3.50, per net ton at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended May 13 at 440,678 tons, an increase of 29,478 tons, and shipments at 440,177 tons, an increase of 29,648 tons.

St. Louis—There is a heavy demand for foundry coke. Outside shipments into St. Louis have increased considerably, owing to the fact that the byproduct plant here has all the business on foundry coke that it can possibly handle.

Buffalo—The market is still weak. Shippers do not promise an early recovery, as they did when the foundry price dropped below $6. It is apparent now that the prices had become too high. Quotations are on the basis of $5.10 for 72-hr. Connellsville foundry, $4.30 for 48-hr. furnace, $3.70 for high sulphur and $3.45 for stock. The movement is fairly good.

Chicago—Byproduct coke ovens are sold up for several months ahead. Shipments are in large volume at high prices. Contract specifications for foundry coke are heavy.

Quotations per net ton of 2,000 lb. f.o.b. cars Chicago are as follows: Connellsville, $6@6.25; Wise County, $6.25; byproduct foundry, $6.25@6.50; byproduct domestic, $4.60@4.70; gas house, $4.50@4.60.

MIDDLE WESTERN

GENERAL REVIEW

Western market situation steady with screenings a trifle easier and domestic demand quiet. Anthracite prices generally advanced 25c. per ton. Western mines averaging 50 per cent. working time.

Present market demands are about sufficient to cause the operation of the Indiana and Illinois mines on a half-time schedule. The demand for steam coal is little above normal for May, with very little trade in domestic sizes, although increased calls for quotations on domestic grades are being received from retailers. The output mostly is devoted to the steam trade, and some little tendency is noted toward an easier screenings market. This is due to consumers using up storage coal and to the operators shipping large quantities of screenings from storage piles on the ground at the mines.

From this it is gathered that the Western trade will be asked to stand an advance of 25c. per ton, with the usual summer discounts; pea coal showing an increase of from 15c. to 25c. per ton. Anthracite buying, however, is very light in Western territory.

Prices for Western bituminous coals continue to hold firm, and shippers are evidently disposed to follow the policy of watchful waiting without making any concessions to induce sales. Western trade centers are almost entirely free of Eastern track coal, and smokeless coals are in a much better position than for several months past. Lake trade shows a light vessel movement recently. Docks have received only scattered cargoes, and at this rate May receipts will be less than anticipated. Lake prices as well as cargo rates are much higher than last year.

CHICAGO

Smokeless coals improved. Retailers place additional orders. Stocking of anthracite not yet commenced. Screenings in steady demand at continued high prices.

The tonnage movement of all grades of southern Illinois coal is very light. Williamson, Franklin and Carterville mines are operating between 40 and 50 per cent. of capacity. There is hardly any domestic business, and large quantities of storage coal are still in the hands of consumers. Shipments are mostly of steam fuel, and some mines are crushing coarse sizes to meet the call for fine coal. Prices for all sizes are steadily maintained. It is expected that some big screenings buyers will be in the market for southern Illinois screenings shortly, which is expected to cause further stiffening in fine coal. Franklin County operators seem to have little difficulty in obtaining high prices on contract coal.

Pocahontas and New River smokeless coals show improvement. Mine run has been firm because of increased orders from retailers. Prepared sizes on track have been absorbed, and spot shipments from the mines are much reduced in volume. Country trade is making inquiries for future delivery, and the outlook is more favorable all around.

Little buying of anthracite is noticeable due to the puzzling price situation. Dealers still have sufficient hard coal on hand to meet intermittent demands of householders, which spring up for a few days owing to raw weather.

Quotations in the Chicago market are as follows per net ton f.o.b. cars mines:

	Williamson and Franklin Co.	Springfield	Sullivan	Clinton	Knox and Greene Cos.
Lump	$1.35@1.45	$1.35@1.50	$1.40@1.50	$1.40@1.50	$1.40@1.50
Steam lump	1.35	1.25@1.30	1.30@1.35	1.30@1.35	1.30
2½ and 3-in. lump	....	....	1.40@1.45	....	1.25@1.35
1¼-in. lump	....	....	....	....	....
Egg	1.35@1.45	1.25	1.45@1.50	1.35@1.50	1.30@1.35
Nut	1.35@1.45	1.20@1.25	.90@1.00	1.35@1.40	1.25@1.30
No. 1 washed	1.45@1.50	....	....	....	....
No. 2 washed	1.35@1.40	....	....	....	....
No. 1 nut	1.35@1.45	....	....	....	....
No. 2 nut	1.30@1.35		....	....	....
Mine-run	1.25	1.10@1.15	....	1.10@1.15	1.15
Screenings	1.00@1.10	.90@.95	.90@.95	95@1.00	1.00@1.10

	Harrisburg & Saline Co.	E. Kentucky	Pocah. & W.Va.Smok'l.	Penna. Smokeless	Hocking
Lump	$1.40@1.45	$1.50@2.00	$1.50@1.75	$1.60@1.75	$1.60@1.70
1¼-in. lump	1.45@1.50	....	....	....	1.40@1.50
Egg	1.35@1.45	1.35@1.85	1.40@1.70	1.55@1.70	1.60@1.70
Nut	....	1.20@1.60	1.40	1.25@1.50	....
No. 1 nut	1.35@1.45	....	....	....	....
No. 2 nut	1.35	....	....	....	....
Mine-run	1.25	1.20@1.25	1.15@1.25	1.15@1.25	1.25
Screenings	.95@1.00	.95	....	....	....

ST. LOUIS

The weather has been unseasonable and house coal bins have been emptied. Considerable coal which was stored has rendered buying light. Steam coal is showing strength but lump is hard to dispose of.

While a number of grades of coal are announced on the list prices as being advanced on the first of June, there is nothing in the demand to warrant this advance. The month of May this year has probably been one of the lightest in point of tonnage shipped that has been recorded in recent years. Owing to a large amount of storage coal on hand there has been practically no buying of moment of the steam grades or railroad coal, and the dealer demand of course has been at low ebb.

Mines in the Standard district are operating on the whole only about two days a week. In the Springfield and Mt. Olive districts, those mines having the advantage of shipping to the northern markets, the working time is perhaps a fraction better. In Franklin County about one-third of the mines are shut down and the balance are operating about three or four days a week.

While the coal business is so dull the sales agents are mostly out hustling for contracts and spending their energies toward booking future orders.

Quotations on bituminous in the St. Louis market per net ton f.o.b. cars at mine are as follows:

	Franklin County	Williamson County	Staunton and Montgomery Counties	Intermediate	Standard
6-in. lump	$1.45	$1.25@1.45	$1.25@1.40	$1.15@1.25	$1.00
6x3-in. egg	1.45	1.25@1.45	1.25@1.40	1.15@1.25	1.00
3x2-in. nut	1.45	1.25@1.45	1.25@1.40	1.15@1.25	1.00
No. 2 nut	1.40	1.10	1.10	.....	.95
No. 3x4	1.30	.....	.....	.....	.....
Screening	1.00	.95	.85	.....	.80
2-in. lump	.....	.....	1.15@1.25	1.10	.85
Steam egg	.....	.....	.....	.....	.85
Mine run	1.25	1.10	1.10	1.00	.80
Washed					
No. 1 nut	.....	1.50	1.40	1.40	1.40
No. 2 nut	.....	1.35	1.25	1.25	1.25
No. 3 nut	.....	1.30	1.20	1.20	1.20
No. 4 pea	.....	1.25	1.15	1.15	1.15
No. 5 slack	.....	.80	.80	.80	.80